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SUMMARY OF RECENT ABSTRACTS*

VIII. TYPHUS GROUP OF FEVERS†

General

Serological evidence of typhus (47·8%), rickettsialpox (20%), Q fever (31·3%), psittacosis (56·5%) and mumps (33·9%) was found by TERZIN (p. 552) in sera from healthy persons in rural areas of Bosnia and Herzegovina. Rickettsialpox has not been diagnosed clinically, and the serological reaction may reflect a response to other rickettsioses. In the Isthmus of Panama SILVA-GOYTIA and CALERO (p. 279) found serological evidence of infection with *R. rickettsi* (10%), *R. burneti* (0·9%) and *R. prowazeki* (1 case, the first to be recorded).

SCHAECHTER *et al.* (p. 804) observed by phase microscopy the process of growth of rickettsiae in tissue culture cells; details should be sought in the original.

MEL'NIKOV (p. 1306) describes a method for preparing antigens from various rickettsiae for the sensitization of sheep red cells for the haemagglutination test. The value of this test in the diagnosis of rickettsial diseases is being studied.

For the surface-fixation test stained organisms are placed in suspension on filter paper, and after drying are treated with droplets of serum; the paper is then suspended with its lower end in saline solution, and if there are no agglutinins in the serum the stained organisms travel with the saline up the paper; if there are agglutinins the organisms remain at their original site [see *Bull. Hyg.*, 1950, 805; 1953, 1050]. RUIZ CASTAÑEDA (p. 1307) applied this test to sera from patients with typhus and

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1957, v. 54. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

† For previous articles on typhus group of fevers in this series see the October issues of the *Tropical Diseases Bulletin* each year since 1939.

tsutsugamushi disease, using *Proteus OX19* and *Proteus OXK*, and found the test specific.

Proteus OX19 Type. Vectors: Louse and Flea

In Ethiopia typhus breaks out usually twice each year, and Reiss-Gutfreund (p. 801) investigated the possibility of an animal reservoir, finding positive agglutination tests (with an antigen from *R. prowazeki*) in high titre in cattle, sheep and goats, and isolating rickettsiae identical with classical strains of *R. prowazeki* from apparently healthy animals and from pooled ixodid ticks. It seems, therefore, that there may be a double cycle in classical typhus in that country, namely animal-tick-animal, and man-louse-man. The cycles may be linked through accidental infection of man by ticks. The subject is obviously of great importance.

Louse-borne typhus still occurred in 1952–54 in Poland where Kostrzewski (p. 551) reports 74 cases in which the source of infection was definitely known, as well as larger numbers in which the source could not be found, or in which the attacks were probably recrudescences. In these recrudescences there is no mention of spread to the contacts of these patients. Typhus was epidemic in Poland during the Second World War, and Kołłoto (p. 800) reports recrudescences in recent years. Kostrzewski *et al.* (p. 801) calculate, on the evidence of earlier experience of the disease, that recrudescences may be expected to increase up to about 1960, after which they should gradually diminish. In a case of Brill's disease in Hamburg Weyer and Hornbostel (p. 1066) succeeded in infecting lice by feeding them on the patient during this recrudescence of an infection acquired 10 years earlier, and in infecting guineapigs by inoculating blood from the patient.

A difference between *R. prowazeki* and *R. mooseri* was noted by Roger and Roger (p. 20) who found that it was difficult to infect hamsters by the nasal route with *R. prowazeki* but easy with *R. mooseri*, which produced massive infection.

In experiments on laboratory animals Wojciechowski *et al.* (p. 1167) found that *R. prowazeki* could be recovered from brain, spleen, adrenals and bone marrow 16–20 days after infection.

Weiss *et al.* (p. 940) succeeded in producing a strain of *R. prowazeki* resistant to PABA by serial passage in chick embryos which had received injections of PABA. A true mutation was probably involved in the process.

R. prowazeki may be inactivated by storage for a short time in dilute salt or sucrose solution at 0°C., but this effect can largely be reversed by subsequent incubation at 33°C. in a medium containing diphosphopyridine nucleotide, certain inorganic ions, coenzyme A, glutamate and albumin (Bovarnick and Allen, p. 940).

Sérié *et al.* (p. 668) report changes in the haemolymph protein of

Pediculus humanus after infection with *R. prowazeki*, detected on micro-electrophoresis.

In an extensive study on patients with various diseases SIENNICKI (p. 150) found that the Weil-Felix reaction had no diagnostic value in sporadic cases of typhus, but that the complement-fixation test with rickettsial antigens was specific, except that some non-specific reactions occurred at low titre. A titre of 1:200 is almost always evidence of typhus, but could be insufficient as evidence of relapse if the subject had suffered from typhus in the past. SUTORISOVÁ-STOLZOVÁ and GEORCH (p. 668) found that after typhus the micro-agglutination titre declined very slowly, much more so than the Weil-Felix and complement-fixation titres.

ARCHETTI and BABUDIERI (p. 151) found a vaccine of *R. prowazeki* much more effective in animals if made with a preparation of mineral oils than with saline.

An electron microscope study of *R. mooseri* in embryo yolk sac tissue at various stages of infection is reported by WISSIG *et al.* (p. 411). GREIFF *et al.* (p. 944) studied the effect of X-radiation on the multiplication of *R. mooseri* in fertile eggs. Irradiation of the eggs appeared to enhance growth of the rickettsiae and to almost abolish * the inhibitory action of streptomycin (but not of penicillin or chlortetracycline).

In tests of various antibiotics on their power to inhibit the oxidation of sodium glutamate by suspensions of the rickettsiae of murine typhus TERADA *et al.* (p. 803) found that aureomycin had the greatest effect.

FOX (p. 276) notes that in Puerto Rico the incidence of murine typhus in man fell from 100 cases in 1944 to nil in 1954, and the proportion of *Xenopsylla cheopis* on rats also fell; but these reductions are not necessarily the result of control measures.

A programme of destruction of rats by poisoning, and flea control by DDT, was successful in eliminating murine typhus from the few rats which persisted in American farmsteads treated in this way (MOHR and SMITH, p. 1066).

Proteus OXK Type. Vector: Mite

Scrub typhus occurs in north Queensland, and DOHERTY (p. 151) describes 53 cases. The mode of onset varied, but when it was sudden the clinical picture suggested leptospirosis. Respiratory involvement occurred in some patients. Abnormal liver function tests were found but were not attributed to liver damage, but rather to antibody response. Two small outbreaks of scrub typhus in Netherlands New Guinea are reported by HOOGERHEIDE and ENSINK (p. 669).

In a paper on trombiculid mites of Malaya AUDY (p. 1168) remarks that the vectors of scrub typhus, *T. deliensis* and *T. akamushi*, though essentially parasites of mammals, do occur on ground birds such as quail. The same author (pp. 1255, 1308) has contributed a series of papers on

* The infinitive is split intentionally.

the trombiculids of the Malayan region. In an investigation of the trombiculid mites of 2 small Japanese islands where a severe form of tsutsugamushi disease was prevalent YAMAGUCHI *et al.* (p. 669) were led to the conclusion that the probable vector was *Trombicula tosa*, which was always present in the affected areas and was closely associated with *Rattus norvegicus*, which in turn was closely associated with man.

DUMOULIN and BRYAN (p. 1400) describe the clinical features of scrub typhus in southern Sumatra. They rely on the Weil-Felix reaction with *Proteus OXK*, since the rickettsial complement-fixation test is highly strain-specific, and suitable local antigens are not available, but even so the Weil-Felix titres fail to reach diagnostic levels in 30% of cases. Treatment with chloramphenicol is successful, but prevention by immunization, protective clothing, repellents, and the extermination of rodents or vectors by insecticides is not practicable.

In part of Japan a fever known as 20-days fever was investigated by FUJITA *et al.* (pp. 152, 153) who found evidence suggesting tsutsugamushi disease. Some rodents were found infected and certain trombiculid mites were collected, including *Trombicula scutellaris* and *T. candida* which have been suspected as vectors of tsutsugamushi disease, but not *T. akamushi*. From Japan TAKIGAMI *et al.* (p. 277) describe an exanthematic disease in which *Rickettsia tamiyai* has been recovered from the blood, and the complement-fixation test with this organism was positive at high titre. The fever is known as Ezo fever, and is evidently allied to tsutsugamushi fever, and AKIBA *et al.* (p. 278) describe a case in detail in which chlortetracycline effected rapid cure.

NOSE (p. 1308) determined the opsonic index and phagocytic index in experimental tsutsugamushi disease, using *Proteus OXK* as the test organism.

KATSURA *et al.* (pp. 803, 804) have reduced the total amount of aureomycin or tetracycline to one-fifth or one-tenth of the amount formerly used for the treatment of tsutsugamushi disease, but given over a longer period (3 weeks), and have obtained equally good results, with even a reduction in the relapse rate. Spiramycin was found by BARME (p. 1067) to be effective by mouth in experimental scrub typhus.

HARRISON (p. 1169) produces experimental evidence to suggest that removal of rats from an area infected with scrub typhus will actually increase the risk of the disease in man because the chiggers which hatch out in the absence of rats accumulate near the surface of the soil until either the rats return or a chance host (possibly man) appears. Normally the rats, by repeatedly returning engorged chiggers to their own rat range, establish self-infestation. It has been suggested that the burning of grass in Malaya may control scrub typhus, but HARRISON (p. 1169) has found that this has little direct effect on the mites, though by destroying the ground cover it produces conditions temporarily too dry for them. On the other hand it results in the perpetuation of grassland (because the rhizomes are not destroyed) which is favourable to the mites.

Rats caught in a place where scrub typhus had occurred in Malaya were found to be infested with mites, but LAWLEY (p. 669) found that after the land had been treated with dieldrin the rats lost their mites.

Indeterminate Type. Vector: Tick

Boutonneuse fever is widespread in the province of Savona, Italy, and CAPUTO (p. 1170) notes that it has a seasonal incidence with most cases in August. The vector, *Rhipicephalus sanguineus*, is a dog tick, but may be found in the sand of the Ligurian beaches.

CAUVIN *et al.* (p. 670) recall cases of infective endocarditis due to rickettsial infections, in which cure has been obtained with chloramphenicol or spiramycin. They quote one such case in which persistent boutonneuse fever was involved.

HEISCH (p. 1068) has recovered rickettsiae from dog ticks (some of which are also found in rodent burrows) and from *Otomys* in Nairobi, where tick typhus is endemic. A volunteer infected with the tick strain developed the typical disease, which is a zoonosis.

An account of the tick-borne typhus of northern Asia is given by KIREEVA (p. 412); the seasonal incidence is very marked, most cases occurring in June–August and apparently being contracted in woodland.

In discussing Rocky Mountain spotted fever CAWLEY and WHEELER (p. 805) state that during the first 7–10 days of the illness the diagnosis rests on the likelihood of a tick bite and on fever and the rash; *Proteus* agglutination is usually positive between the 10th and 15th days of the disease.

DE MAGALHÃES (p. 275) sums up the contribution he has made to the knowledge of diseases of the typhus group in Brazil, where he has distinguished the local tick typhus ("neotropical typhus exanthematicus of Brazil") from Rocky Mountain spotted fever, largely on the ground that the Weil-Felix reaction with *Proteus OX19*, *OX2* and *OXK* is moderately to strongly positive, whereas in Rocky Mountain spotted fever it is only weakly positive with all three.

Q fever

Laboratory infections with *Rickettsia burneti* are reported by GERBEC and MORELJ (p. 556) in 11 of 12 persons who harvested infected yolk sacs or entered rooms in which the material was handled, and by STOKER (p. 671) in persons working in a room below a laboratory in which a sink became blocked; infective material from this sink flooded the floor of the room below, and infection was probably due to inhalation of droplets.

In an investigation of Q fever in an urban area of south-east England MARMION and HARVEY (p. 413) found serological evidence of the disease in a number of people who had suffered from pneumonia or undiagnosed fever, and also found a strong indication that the source of infection was raw cows' milk. MARMION and STOKER (p. 414) also investigated 2 rural

areas. In the first, Romney Marsh, where there was a large population of sheep, there was evidence of considerable human infection, probably as a result of inhalation of dust infected by discharges from animals, or from drinking infected cows' milk. In the second, in Cambridgeshire, there was almost no evidence of the infection.

Sautet (p. 805) reports Q fever in an abattoir worker in Marseilles; he apparently had a relapse in spite of antibiotic treatment, and animals could be infected by inoculation of his blood.

Gaburro and del Campo (p. 21) record Q fever in premature infants in Italy, who probably acquired the infection by inhalation of infected material from flocks of sheep grazing near the apartment in which they lived. For the first time in Yugoslavia Likar (p. 280) isolated *R. burneti* from goats' milk.

Serological evidence of Q fever was found by Raška *et al.* (p. 280) in various rodents in Bohemia, and *R. burneti* was isolated from some species. Insectivores were uniformly negative. In Czechoslovakia Syrůček and Raška (pp. 557, 672) found important serological evidence of infection with *R. burneti* in various wild birds and domestic fowls. The focus of the disease where this investigation was made was probably set up by the importation of infected sheep, and hens and other poultry represent a possible source of infection for man. Migratory birds may be responsible for transmitting the infection over long distances. The authors also found evidence of past infection in up to 57% of domestic animals and in some of the rodents captured in one heavily infected locality, and they suggest that the rapid spread of infection in this whole animal community suggests an extension over "virgin soil". Syrůček and Soběslavský (p. 24) infected *Rattus norvegicus* with *R. burneti* and observed excretion in urine and faeces for 13–38 days after infection. Blood infection was found 7–26 days after infection and complement-fixing antibodies appeared in the second week, but the rats did not display symptoms. Rats appear to be potential links in the epidemiology and epizootiology of this infection. In Bohemia Rehn and Radvan (p. 808) isolated *R. burneti* from *Ixodes ricinus*, and found serological evidence of Q fever in a roe, a pheasant and a cow.

Hens infected with *R. burneti* by various routes excreted the organisms in the faeces 14–42 days after infection, but complement-fixation titres were low and the hens were not ill. Soběslavský (p. 1401) shows that the organisms were transmitted to eggs and chickens, which proves that transovarian transmission can occur.

The first outbreak of Q fever recognized in Poland occurred in workers taking samples of wool from sheep imported from Rumania (Lutyński *et al.*, p. 1171), and one outbreak was due to an imported flock of sheep; cattle and goats were much less affected (Oleś *et al.*, p. 807; Wojciechowski *et al.*, p. 808).

Q fever is reported from the Crimea by Korolev and Kolotygina (p. 153), who remark that the infection was common in cattle, and by

ZAITSEV and POKROVSKAYA (p. 154); it is recorded from the Altai province by ZEITLENOK and PILLE (p. 154), who report antibody in yaks and domestic animals. In the Crimea BEKTEMIROV *et al.* (p. 553) isolated *R. burneti* from cows' udders, livers and spleens, from raw milk, and from the air of cattle sheds, and also from ticks, in which ovarian transmission was demonstrated. Positive serological tests were demonstrated in cattle and sheep, and in persons in contact with them, in various parts of Azerbaijan (STERKHOVA and MIRZOEVA, p. 554). Q fever in farm workers and their cattle in an area of the Caucasus is reported by KULAGIN and SILICH (p. 555), who showed by laboratory tests that *R. burneti* could survive in water at 20–22°C. for up to 160 days.

Workmen engaged in reclaiming land in Kazakhstan became infected with Q fever, and PCHELKINA *et al.* (p. 554) isolated *R. burneti* from one patient and from *Ixodes crenulatus* caught on a polecat. ZHMAEVA *et al.* (p. 555) detected infection with *R. burneti* in larvae of *Hyalomma anatolicum* collected in southern Kirghiz.

In Russia FEDOROVA *et al.* (p. 555) found Q fever in workers handling cotton from Central Asia but could not isolate *R. burneti* from it. They suggest that the cotton may have been contaminated by cattle when it was stacked by the roadside after picking.

BLANC and BRUNEAU (pp. 155, 556) isolated *R. burneti* from wild *Apodemus sylvaticus* and *Lemniscomys barbarus* in a forest near Casablanca, Morocco. *Hyalomma excavatum* was infected, but *Rhipicephalus sanguineus* only rarely, and *Ixodes* never.

CRADDOCK (p. 557) has encountered Q fever in the European residents of a farming area of Kenya, and BROWN (p. 415) found antibodies in dogs, camels, goats and cattle in that country.

An outbreak on ships of the French navy at Saigon is reported by QUINTIN *et al.* (p. 946); there was circumstantial evidence that spread was by droplet infection.

Complement-fixation tests for Q fever have been found positive in a survey of cattle and man in Wisconsin, but KITZE (p. 1401) states that the significance of these findings in man has yet to be determined since only 1 case of pneumonitis was diagnosed during the survey. SNODGRASS (p. 21) reports cases at an air station in Texas.

SALVERAGLIO *et al.* (pp. 22, 415) describe Q fever from Montevideo, for the first time. The patient worked in a meat-packing establishment, and a few other workers gave positive serological tests, as did a proportion of the cattle tested.

DE MAGALHÃES (p. 22) reports a case from São Paulo, believed to be the second recorded in S. America.

The fine internal structure of *R. burneti* from infected yolk sacs was studied by STOKER *et al.* (p. 416). WEISS and PIETRYK (p. 23) grew *R. burneti* in monolayer cultures of entodermal cells from the avascular membrane of 14-day chick embryos, and found that this technique was suitable for a quantitative method of assay.

Roux (p. 23) comments on the great variation which can take place in the pathogenic power of *R. burneti*.

Roger *et al.* (p. 156) produced exanthemata in rabbits by intradermal injection of doses of *R. burneti* distributed in fractions into separate areas of the skin; these were either maculo-papular or scarlatiniform.

Brezina (p. 281) prepared a soluble antigen from *R. burneti* and found that it reacted in the complement-fixation test after concentration, and also that it possessed some immunizing power. Antigens from strains of *R. burneti* which are not fully egg-adapted (Phase 1) generally provoke antibodies which are not detectable for at least 20 days, whereas antigens from fully egg-adapted strains (Phase 2 variants) provoke antibodies detectable soon after inoculation. Fiset (p. 1171) comments that this second antigen tends to mask the first, and appears to behave as a surface antigen. This work may have a bearing on anomalous findings in serological tests on different strains of *R. burneti*.

Luoto (p. 416) found the capillary-tube agglutination test for *R. burneti* to be about as sensitive as the complement-fixation test, and easy to perform.

In an extensive serological survey for Q fever of man, sheep and cattle near Naples di Sapio and Lecaldano (p. 806) found that the rickettsia-agglutination test was more sensitive than the complement-fixation test, and remained positive for a longer time, but because sometimes the complement-fixation test was positive when the other was not, the authors think that both should be performed.

Ludwig (p. 24) reports Q fever which presented the features of hepatitis.

In the workers at a meat-processing factory in Russia, where there had been an outbreak of Q fever, Somova and Gerasyuk (p. 558) made a large trial of a killed vaccine of *R. burneti*. Reactions were common and complement-fixing antibodies appeared to titres of 10–640 (average 75) in 40% soon after vaccination. Zubkova *et al.* (pp. 155, 559), who carried out a mass trial with a Q fever vaccine in the Kirghiz province of U.S.S.R. where the infection is common, also noted reactions to the vaccine. Late results showed complement-fixing antibody at titres up to 320 in 47% of persons examined 10 months after vaccination.

Evans (p. 20) in Wales inoculated raw and pasteurized milk into guineapigs and later tested the animals for complement-fixing antibodies to *R. burneti*. 5% of samples of raw milk from individual herds, 38·2% of samples of bulked raw milk, and 5·5% of samples of pasteurized milk produced positive results. 2·7% of sheep were also positive in the area, and 4·1% of human sera from blood donors, but the known incidence of clinical Q fever was very low—only 0·6% of 2,482 consecutive cases of non-bacterial pneumonia. In a test of the value of commercial pasteurization in killing *R. burneti* in milk Enright *et al.* (p. 1309) found that 143°F. for 30 minutes could not be relied on, but 145°F. could. For the high-temperature short-time process 161°F. for 15 seconds was adequate, but not 160°. Pasteurization can therefore be adequate if

properly carried out, but in comment Garrod points out that the margin of safety is very narrow. *Charles Wilcocks*

MALARIA

In this section abstracts are arranged as far as possible in the following order:—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

Peters, W. **A Malaria Survey in the Western District of Papua.** *Papua & New Guinea Med. J.* Port Moresby. 1957, Feb., v. 2, No. 2, 25–38, 3 figs. & 1 map. [20 refs.]

The previous surveys of malaria in Papua, which are here reviewed and listed, are few and refer mainly to coastal regions [see, for example, this *Bulletin*, 1955, v. 52, 506, 703]. The present survey was undertaken in coastal and inland parts of the Western District, which includes one of the world's largest swamps, 400 miles in length, much low-lying flat land liable to inundation, and smaller hill areas. The population is extremely sparse, with a density of only 1·3 persons per square mile, and the climate is of the equatorial oceanic type.

Spleen rates, parasite rates and gametocyte rates, with gametocyte densities, are classified by age for 14 different villages. They indicate a widespread state of hyperendemicity in which a considerable immunity is gained by the population, and dense gametocyte infection is limited to the younger age-groups. The anophelines captured were *Anopheles bancrofti*, *A. farauti* and the intermediate forms of the *A. punctulatus* complex. These last two are said to be the main vectors and some description is given of their resting habits. The extremely scattered and sparse nature of the population, and the temporary types of housing used would probably make control by residual insecticides difficult, though this is not yet confirmed. If it were so it might be necessary to turn to mass chemoprophylaxis or efforts at control by mass chemotherapy.

G. Macdonald

Teriteanu, E., Constantinescu, P., Şofletea, A., Balif-Negulici, E. & Cortez, P. Contribuţii la studiul biologiei tulpinilor de *P. vivax*. Raporturi imunologice între tulpini de *P. vivax* autohtone şi o tulpină de *P. vivax* "K" din Extremul Orient. [**Biological Studies of Strains of** *Plasmodium vivax*. **Immunological Relationship between Rumanian Strains and a Strain of** *P. vivax* **from the Far East**] *Studii şi Cercetări Inframicrobiol., Microbiol. şi Parazitol.* 1957, v. 8, No. 3, 445–56. [13 refs.] French summary.

The authors have studied the behaviour of 4 Rumanian strains of *Plasmodium vivax* and 1 from Korea. The incubation period of the

Korean strain by intravenous transmission did not differ from that of the Rumanian strains, and varied in accordance with the number of parasites transmitted and the blood groups of donor and recipient. After 12 passages gametogenesis no longer occurred, but persisted through 66–150 passages in the Rumanian strains. The Korean strain could be transmitted by *Anopheles maculipennis atroparvus*. In a group of 335 patients in whom malaria was induced for therapeutic purposes 278 became infected with the Korean strain at the first inoculation, and 57 became infected after having had a previous infection with a Rumanian strain; a higher spontaneous cure rate was seen with the Korean strain. The quotidian type of febrile response predominated with all strains. In successive reinfections with different strains cross-resistance was observed between the Korean and the Rumanian strains.

[See also Shute and Maryon, this *Bulletin*, 1955, v. 52, 244.]

D. J. Bauer

Gillies, M. T. **Notes on the Biology of a new Subspecies of *Anopheles wellcomei* (Diptera: Culicidae) from East Africa, and on the distribution of Related Forms.** *Proc. Roy. Entom. Soc. of London.* Ser. A. 1958, Apr. 9, v. 33, Pts. 1/3, 9–14, 9 figs. [11 refs.]

A map of Africa shows the recorded distribution of *Anopheles wellcomei*, the new subspecies *erepens* and *A. distinctus*.

A. wellcomei erepens occurs in the South Pare District of Tanganyika and is most prevalent from May to August. Females attack man at night more frequently outside than inside houses, though it seems they are primarily zoophilic. No sporozoites were found in glands dissected from 127 mosquitoes but in the absence of other more potent vectors, where it is abundant, this subspecies must be suspected as a possible malaria vector.

H. S. Leeson

Fiorillo, A. M., Bassoi, O. N. & Meira, J. A. Contribuição ao estudo da malária. I.—Quadro protéico na malária aguda. [**Studies in Malaria. I. Serum Proteins in Acute Malaria**] Reprinted from *Rev. Hosp. Clín.* 1958, Jan.–Feb., v. 13, No. 1, 1–9, 5 graphs & 5 figs. [19 refs.]

The English summary appended to the paper is as follows:—

"An electrophoretic study of the serum proteins in malaria was done by the authors utilizing the paper electrophoresis. The serum of 15 patients with malaria caused by *Plasmodium falciparum* and *P. vivax* was studied. No important difference was verified according to the parasitic species. The more important changes consisted of hypoalbuminemia and

hypergammaglobulinemia; the alpha$_1$ globulin showed a tendency of being elevated.

"The authors discussed the findings in relation to the liver function tests (cephalin-cholesterol flocculation, thymol turbidity and formol-gel tests).

"The C-reactive Protein test in cases in which it was studied resulted strongly positive."

GRANIRER, L. W. **Exfoliative Dermatitis as a Complication of Chloroquine (Aralen) Therapy in Rheumatoid Arthritis.** *Arch. Dermat.* 1958, June, v. 77, No. 6, 722–4, 4 figs.

"A case of acute exfoliative dermatitis secondary to chloroquine (Aralen) therapy in rheumatoid arthritis is reported. There was no previous history of dermatitis, allergy, or drug sensitivity. The dramatic onset of symptoms occurred 20 days after the onset of treatment with a single dose of 250 mg. chloroquine daily. Patients receiving the drug should be warned of possible severe skin reactions."

CLYDE, D. F. *Plasmodium falciparum* **Resistant to Pyrimethamine in Non-Immune Europeans in Tanganyika.** *East African Med. J.* 1958, Apr., v. 35, No. 4, 181–6. [12 refs.]

3 cases of pyrimethamine-resistant *P. falciparum* malaria among Europeans residing in eastern Tanganyika are reported. All the patients lived in proximity to a tea estate on which forms of *Plasmodium falciparum* insusceptible to spaced treatments with pyrimethamine had appeared among African labourers.

Case 1 was a boy 7 years old whose home was 4 miles north of this estate. He had been under weekly pyrimethamine prophylaxis (25 mgm.) for 3 months at a boarding school in a highland district and subsequently for 3 weeks at home under parental supervision. Case 2 was the wife of a malaria research officer stationed at Amani, 2 miles distant from the estate, who had been on pyrimethamine prophylaxis (25 mgm. weekly) for 4 months preceding her attack. Case 3 was a scientific officer, also stationed at Amani, who had taken 25 mgm. pyrimethamine weekly for several months. It is considered that cases 2 and 3 may be accepted as proven instances of *P. falciparum* malaria breaking through weekly pyrimethamine prophylaxis. The author notes that a number of other people stationed at Amani who are under daily proguanil prophylaxis have not suffered from malaria.

References are given to several other cases of *P. falciparum* malaria resistant to pyrimethamine previously reported from East Africa [this *Bulletin*, 1953, v. 50, 906, 1006; 1954, v. 51, 679]. *G. Covell*

Bol. Oficina Sanitaria Panamericana. 1958, May, v. 44, No. 5, 408–10. El uso de drogas en los programas de erradicación de la malaria. [**Use of Drugs in Malaria Eradication Programmes**] (Documento PASB/ME No. 16, noviembre 12, 1957).

Ciuca, M. Etat actuel de l'action antipaludique ayant comme objectif "l'éradication". Principes et méthodes de lutte basés sur les résultats de 7 années d'expérience roumaine en matière d'insecticides —a effet remanent—utilisés contre le "facteur—transmission". [**Present Situation of Malaria Control aimed at Eradication. Principles and Methods used in Rumania for 7 Years, with special reference to Residual Insecticides**] *Mem. Inst. Oswaldo Cruz.* 1957, Dec., v. 55, No. 2, 283–93.

[See this *Bulletin*, 1957, v. 54, 779, 1291.]

Rafi, S. M. **Malaria Control in West Pakistan.** *Pakistan J. of Health.* 1957, Oct., v. 7, No. 3, 93–7.

The author has previously described the incidence of malaria in West Pakistan and the measures undertaken for its control, with some analysis of their results [this *Bulletin*, 1956, v. 53, 1094]. He here summarizes the position for the benefit of the Tenth Pakistan Science Conference, giving a statement on the general importance and incidence of the disease with the measures that have been taken to control it. He poses the question whether future activity is to have the objective of control or eradication, giving a balanced statement of the aims and methods of both.

G. Macdonald

Pletsch, D. J. **Progress toward Malaria Eradication in the Americas with special reference to Mexico.** *Amer. J. Pub. Health.* 1958, June, v. 48, No. 6, 713–16.

[See this *Bulletin*, 1958, v. 55, 985.]

d'Alessandro, G., Frizzi, G. & Mariani, M. Ulteriori osservazioni sui rapporti fra ordinamenti cromosomici e resistenza al DDT in *Anopheles atroparvus*. [**Further Observations on the Connexion between Chromosome Order and Resistance to DDT in** *Anopheles atroparvus*] *Riv. di Parassit.* Rome. 1958, Jan., v. 19, No. 1, 67–72, 3 figs. on pl. English summary (7 lines).

It has been suggested that the resistance to insecticides can be correlated with a particular chromosomal arrangement and in connexion with

this two strains of *Anopheles maculipennis atroparvus* have been examined by means of the chromosomal technique of Frizzi [this *Bulletin*, 1954, v. 51, 454] for the larvae and that of Mariani and Bruno (*Boll. Soc. Ent. Ital.*, 1957, v. 87, 23) for the adults.

One strain was selected with DDT in the larval stage in each generation, and had a resulting resistance of about 5 times that of the original stock. Two consecutive generations of this and the corresponding generations of the original stock were examined.

The frequency of each of the possible arrangements, *i.e.*, standard homozygous, inverted homozygous and heterozygous, in the left arm of the third chromosome from zone 44 to the limit between zones 47–48 was noted for each stock and generation.

It was found that the inverted order was greater in frequency in the selected stock than in the original stock. When the figures were submitted to the Hardy-Weinberg formula it was found that the percentages in the succeeding generation in the non-selected stock were very near the expected value, whereas in the selected stock the observed figures differed from the expected by a much larger margin. It would seem that DDT-pressure in the selection has favoured the heterozygous arrangement.

A heterozygous inversion in a chromosomal set isolates a block of genetic material by causing a failure in crossing over. The genetic factors in this block are thus transmitted as a unit to the offspring and it is suggested that this type of resistance is so inherited, the homozygous orders allowing a scattering of the favourable factors during crossing over.

C. Elizabeth Jackson

Hamon, J., Choumara, R., Eyraud, M. & Konade, T. A. Apparition dans la zone-pilote de lutte antipaludique de Bobo-Dioulasso (Haute-Volta, A.O.F.) d'une souche d'*Anopheles gambiae* Giles (diptères, culicidés) résistante au Dieldrin. [**Appearance of a Dieldrin Resistant Strain of *Anopheles gambiae* in a Malaria Control Pilot Zone in Bobo-Dioulasso, French West Africa**] *Bull. Soc. Path. Exot.* 1957. Sept.–Oct., v. 50, No. 5, 822–31, 1 fig.

An area of some 7,000 square kilometres surrounding the town of Bobo-Dioulasso in the Upper Volta region, French West Africa, has been the site of an extensive campaign against the vectors of holoendemic malaria in this region, principally *Anopheles gambiae* and *A. funestus*. Village houses, as well as semi-permanent dwellings, were treated with DDT at the rate of 2 gm. per square metre except in two experimental areas where 50% dieldrin wettable powder (500 mgm. per square metre) was used. Dieldrin had not been used before in this region and proved to be more efficient than DDT in reducing the numbers of mosquitoes. After 2 years, during which time dieldrin had been sprayed 3 times, tests at the village of Pala, 7 miles from the centre of Bobo-Dioulasso,

showed that resistance to this compound had developed in *A. gambiae*. By means of the WHO test method [this *Bulletin*, 1953, v. 50, 1176], exposure of the adults to concentrations of up to 0·4% gave a maximum kill of 3%. No resistance to DDT was noted. Laboratory tests on 10-day-old adults of the first generation gave results very similar to those measured in the field, neither 0·4% nor 4% dieldrin causing any mortality. Further field tests carried out in one other village, 40 km. from Pala, indicated that here the level of susceptibility to dieldrin was normal.

If the gene controlling resistance in the Pala strain is the same as in the Ambursa strain from Nigeria, discovered by Elliott and Ramakrishna [*ibid.*, 1956, v. 53, 857] and investigated by Davidson [*ibid.*, 1957, v. 54, 124], one must conclude that the Pala strain is composed almost entirely of homozygous resistants.

The resistance probably appeared during the dry season 1956–57 but remained unnoticed until the onset of the rains in May 1957. As in the case of the Ambursa strain, the selection of this resistant strain took 18 to 23 months.

Dieldrin resistance also developed in Pala in *Cimex rotundatus*, but no details are given. *R. J. Wood*

Livadas, G., Languillon, J. & Delas, A. Note préliminaire sur la susceptibilité aux insecticides les vecteurs principaux du paludisme au Cameroun. [**Preliminary Note on Susceptibility to Insecticides of the Principal Malaria Vectors of the French Cameroons**] *Bull. Soc. Path. Exot.* 1957, Sept.–Oct., v. 50, No. 5, 703–6.

During an investigation in the forest and Western Sahara areas of the French Cameroons, wild-caught *Anopheles gambiae* and *A. moucheti*, the principal vectors of malaria in this territory, were exposed to DDT, BHC and dieldrin by the Busvine-Nash method [this *Bulletin*, 1953, v. 50, 1176]. The results indicated that in neither of the two species was there any resistance, nor could any difference in susceptibility be found between insects from treated and untreated zones. In *A. gambiae* the LC50 for blood-fed females was 0·25% for DDT, and for BHC and dieldrin values below 0·01% and 0·1% respectively. *R. J. Wood*

Davidson, G. **Studies on Insecticide Resistance in Anopheline Mosquitos.** *Bull. World Health Organization*. Geneva. 1958, v. 18, No. 4, 579–621, 5 figs. [26 refs.]

This paper deals at length with laboratory investigations of resistance in three species of anophelines. Two of the investigations have been reported before [this *Bulletin*, 1957, v. 54, 124; 1958, v. 55, 484]; further

details of technique are now given and the results discussed more fully. In addition, the author describes attempts to increase the resistance to DDT of laboratory colonies of *A. stephensi*, by selection pressure [*cf.* KUHLOW, *ibid.*, 1958, v. 55, 629]. Three selected colonies were maintained: one in which insecticide was applied to 4th stage larvae, one in which adults were exposed and one in which the method was alternated in successive generations. The first series was maintained for 20 generations, the second for 11, and the third for 4 generations. In all cases there was a decrease in susceptibility, mainly shown by decreased kills at the lower dose range. However, the overall increase was definitely much less than the specific DDT resistance observed in the field in Saudi Arabia. It is believed that the lowered susceptibility was a form of " vigour tolerance ". The author suggests that this may depend on various non-specific factors inherited by multiple genes and that such changes will revert to normal in colonies maintained without selection pressure from insecticide exposure. *J. R. Busvine*

See also p. 1175, LIU, **A Summary of Recent Insecticidal Tests on some Insects of Medical Importance in Taiwan.**

FLOCH, H. & FAURAN, P. Sensibilité aux insecticides chlorés des larves de *Culex fatigans* et d'*Anopheles aquasalis* en Guyane Française. [**Susceptibility of** *Culex fatigans* **and** *Anopheles aquasalis* **to Chlorinated Hydrocarbon Insecticides in French Guiana**] *Bull. World Health Organization.* Geneva. 1958, v. 18, No. 4, 667–73.

Since 1949, insecticide campaigns in French Guiana have relied on DDT spraying of houses, BHC spraying of stables, etc., and BHC larviciding of drains in towns. The result has apparently been the eradication of *Aëdes aegypti* and *Anopheles darlingi* from the inhabited areas and a drastic reduction in malaria. The insecticides have, however, had little effect on prevalence of *Culex fatigans*, a vector of filariasis, or *Anopheles aquasalis*, a secondary malaria vector (suspected of causing several cases of autochthonous cases in recent years). Tests were undertaken to determine if either of these species had become resistant to insecticides. Measurements of susceptibility levels of the larvae were made by a method advocated by the WHO. The results proved *A. aquasalis* to be very susceptible, both to DDT and BHC. *C. fatigans* was about 5–10 times as resistant to DDT and some 20 times as resistant to BHC as normal larvae tested by other authors. It is concluded that *C. fatigans* may be eluding control because of resistance but that *A. aquasalis* escapes contact with insecticide because of its exophilic and zoophilic behaviour. *J. R. Busvine*

Satya Prakash. **A Note on an Anomalous Route of Transmission and its possible Role in the Epizootiology of Rodent Malaria.** *Bull. Nat. Soc. India for Malaria & other Mosquito-Borne Dis.* 1956, Mar., v. 4, No. 2, 59–60.

4 adult albino rats, weighing 140 to 180 gm. were each given 1 million *Plasmodium berghei* orally by means of a pipette introduced far back into the throat [presumably in the form of infected blood]. Blood smears were examined daily. One animal showed parasitaemia at the 6th day and died with a heavy infection on the 22nd day. A second died from undetermined causes on the 3rd day. The other 2 remained negative for 19 days and were again given parasites orally, this time in a dose of 4 million. Parasitaemia appeared on the 6th and 8th days, respectively.

Before inoculation, all animals were examined for lesions in the oral mucous membrane.

This experimental transmission may have practical implications. Rats fight fiercely for available food and oral transmission of rodent malaria from an infected to a clean host may be possible under natural conditions. Also rodents may eat insects sucking blood from others which are infected.

[See also Sergent and Poncet, this *Bulletin*, 1958, v. 55, 373, who infected 1 of 3 white rats by feeding them on the tissues of infected mice.] *H. J. O'D. Burke-Gaffney*

von Brand, T. & Mercado, Teresa I. **Quantitative and Histochemical Studies on Liver Lipids of Rats infected with** *Plasmodium berghei*. *Amer. J. Hyg.* 1958, May, v. 67, No. 3, 311–20, 8 figs. on 2 pls. [16 refs.]

Earlier work by the authors has shown that the glycogen of rat livers infected with *Plasmodium berghei* is reduced but was increased by giving certain steroids [this *Bulletin*, 1954, v. 51, 1039; 1956, v. 53, 718; 1957, v. 54, 1392]. In the present investigation the relationship between lipid and glycogen has been studied. Female rats about 6 weeks old were used either as controls or experimentally when infected to the extent of more than 30% of erythrocytes. The observations were made on rats in conditions which included starvation for a period, starvation plus injection with meticortelone or fructose, or with both these substances. Lipids were either extracted with ether, or with ether and alcohol and then fractionated. Histochemical examinations were made on frozen sections of formalin-fixed livers stained with oil red O and haematoxylin, and on other livers for the presence of fat and glycogen.

Results indicated that there was an increase of lipid in the livers of infected rats, while in control rats or those receiving meticortelone or fructose this liver lipid was decreased. When the animals were grouped according to the degree of parasitaemia a positive correlation was found

to exist between this factor and increase in liver lipid. The character of the lipid also varied with increased parasitaemia. When liver cells were not irreversibly damaged a restoration of glycogenic function resulted from steroid administration. Centrilobular fatty infiltration in predominantly glycogen-free areas corresponded to the degree of parasitaemia, and the normal picture was not restored by steroid or fructose administration. The occurrence of glycogen and lipid in livers of infected rats treated with these two substances suggests that toxic factors are not responsible for centrilobular glycogen depletion but possibly that adrenal dysfunction may be involved. *J. D. Fulton*

Bishop, Ann. **An Analysis of the Development of Resistance to Metachloridine in Clones of** *Plasmodium gallinaceum*. *Parasitology*. 1958, May, v. 48, Nos. 1/2, 210–34. [16 refs.]

In the introduction the author draws attention to the practical difficulties experienced in this type of work since so far it has not been possible to maintain plasmodia in culture like bacteria. The present investigation relates to the development of resistance in clones (defined as " the progeny of a single individual produced by successive fissions in the complete absence of all fertilization processes ") of *P. gallinaceum* and takes into consideration the amount of drug to which parasites were exposed.

To bring about infection with a single parasite a small trophozoite was obtained on a microscope coverslip by diluting lightly infected blood with citrate-saline and chicken serum by means of a micromanipulator. Two clones A and B were used and behaved similarly. The blood from chicks inoculated with them was used to inject groups of these birds, generally 4 in number, intravenously with known numbers of parasites. Metachloridine was given by stomach tube in the required dose morning and evening for 3½ days, initially just after inoculation. Surviving parasites were inoculated into fresh birds to avoid the complication of exo-erythrocytic forms in the treated birds.

About one-third of the birds infected with a single parasite became infected and showed for a time highly synchronous growth. Gametocytes were present and also exo-erythrocytic forms in the primary infections. After a single course of drug treatment with 0·05 mgm./20 gm. many parasites appeared to be damaged and multiplication was slow at first. Resistant parasites were obtained after 3 to 5 courses of treatment when a dosage of 0·1 mgm./20 gm. was used. In serial treatment of infected chicks a sudden increase in drug resistance was shown during the fifth course. The degree of resistance observed was retained after mosquito passage and for at least 43 days in absence of drug. The use of ½ and 2½ times the above dose in treatment was also studied and caused some variation in the time of appearance of resistance.

A more intensive study was made of how the dosage of drug affected the rate of development of resistance in different strains. In one series of experiments more rapid development of resistance took place when 0·25 mgm./20 gm. drug was given than when one-fifth this amount was used. In general the dosage of drug was not significant regarding the rate of development of drug resistance. The effect of the size of inoculum on development of resistance was then studied. The enhancement of resistance did not always appear to be related to the size of the inoculum as judged by the number of courses of treatment required to produce it. It was interesting to note that two strains became resistant to a dosage of drug higher than that to which they had been exposed. Whereas with some strains the increase in resistance appeared suddenly, in other strains it arose more gradually.

From data obtained on comparing the modes of development of drug resistance in populations of normal parasites and of mixtures of known numbers of normal and resistant parasites it was concluded that resistance in normal populations could be due to mutation followed by selection. These findings are discussed in detail. *J. D. Fulton*

TRYPANOSOMIASIS

In this section abstracts are arranged as far as possible in the following order:—African—*human, animal;* American—*Chagas's disease and other trypanosome infections. In each form the following order is followed:*—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

West African Institute for Trypanosomiasis Research. **Annual Report 1957** [Nash, T. A. M., Director]. pp. iii + 59. 1958. Kaduna, Northern Nigeria.

The staff position was regarded as probably the best in the history of the Institute, except that Dr. Fairbairn left in mid-1957 and will indeed be a great loss, as Dr. Nash, the Director, states. The increased volume of research is described under three main headings, human trypanosomiasis, animal trypanosomiasis and the insect vector.

Human Trypanosomiasis

4 fresh strains of *T. gambiense* were collected but one of those isolated in 1956 was allowed to lapse on becoming avirulent in rats. A *T. rhodesiense* strain passaged cyclically (latterly in *Glossina palpalis*) for over 3 years is no longer cyclically transmissible.

In studies on the conditions necessary to infect *G. palpalis* with *T. gambiense*, the remarkable observation was made that among flies which fed, though unwilling to do so, on the first day of life, a much

higher proportion (7·6%) were infected than among those which would not feed until older (second day flies, 1·1%; third day, nil). This is believed to explain the low infection rate in flies caught at village water holes in Northern Nigeria and to support the belief that sleeping sickness is spread mainly in the hot dry season when the fly is likely to take its first meal soon after emergence.

In a human volunteer, *T. rhodesiense* was shown to develop and multiply in a limited area in the subcutaneous tissues. Blood infection either did not occur early in the incubation period, as is reported in the guineapig, or was not detectable by the methods employed.

Daily counts of the different forms of the human trypanosomes in monkeys and white rats suggest that, at the end of an increase in numbers, the long slender forms (normally the only forms which divide) change through the intermediate stage to stumpy forms which are more resistant and of which a few survive the attack of the host's defence mechanism to re-start the cycle. *In vitro* experiments appeared also to demonstrate the change of slender to stumpy forms. In the course of this work it was observed that the number of trypanosomes inoculated into white rats had no influence on the pattern of infection beyond varying the incubation period.

The respiratory test, an index of the amount of antibody present in a serum as revealed by the suppressive effect of the serum on the oxygen consumption of a test organism, was positive in 17 out of 18 patients infected with *T. gambiense*. With this test in a monkey challenged with non-pathogenic (to the monkey) *T. vivax*, no cross immunity to *T. gambiense* was demonstrated, and the animal was subsequently found to be susceptible to infection with the latter organism.

A relatively insoluble bisquinaldine compound, PR 445, tested against *T. gambiense* in albino rats, had some activity in all dosages employed but a high relapse rate even with the highest dosage.

Patients treated in 1956 with Berenil and controls given pentamidine were reviewed twice. At the 12-months follow-up 14 of the 17 Berenil patients were seen; 13 were symptom-free and had cerebrospinal fluid (CSF) values within normal limits and no detectable trypanosomes. Of the 28 given pentamidine, 26 were seen; 5 had marked changes in the CSF; 2 others had slight changes and may yet relapse. This high relapse rate, in patients originally having no evidence of CSF involvement, was unexpected and disturbing, the more so as clinical deterioration was very rapid after the first review, at 8 months, when 3 had had a pleocytosis but no symptoms and the others appeared well.

Animal Trypanosomiasis

Conflicting views have been held in Nigeria on the economic importance of *T. congolense*, which was difficult to maintain in sheep and dogs. A very virulent strain was isolated in 1956. The dog proved an admirable host but was abandoned because of its susceptibility to other diseases,

including rabies. Sheep are now used as a reservoir to infect *G. morsitans* and rats are readily subinoculated. The cyclically transmitted disease is acute in dogs, goats and rats, less acute in cattle and sheep, and very mild in rabbits. Pigs and guineapigs appear insusceptible to the naturally transmitted infection. The greater mean length of the parasite, its better developed undulating membrane and other morphological characteristics distinguish it from the *T. congolense* of mild infections, and it is believed to be neither *T. congolense* nor *T. simiae* but *T. dimorphon*.

The course of infection with *T. vivax* in relation to the antibody level is being studied in different breeds of cattle and in game animals by means of the respiratory test as an index for antibody and correlation of this with the results of electrophoretic analysis of serum proteins. Descriptions are given of three types of infection in cattle, the acute disease, the chronic disease in partially immune breeds, and the transient infection in hyperimmunes. In a reedbuck heavily challenged, antibody could not be detected by the respiratory test but striking changes occurred in the serum protein pattern, whereas in all the cattle challenged antibody could be detected and showed fluctuations, as did the gamma globulin level.

Phase I trials (small-scale field trials) of Prothidium-suramin and RD-2902-suramin complexes gave less prolonged protection than ethidium-bromide-suramin. The latter was therefore used for two Phase II trials. In the first of these, local reactions after subcutaneous injection, resembling those for ethidium bromide given alone in large doses, were so severe that many beasts lost their drug depots and had therefore greatly reduced protection. Rather inexplicably, the lowest dosage employed was associated with the earliest appearance and the highest incidence of skin necrosis and complete sloughing. The cattle were severely challenged by wild-caught tsetse from several areas, over 40% of which were estimated to have mature infections, predominantly *T. vivax*. All animals remained protected against trypanosomiasis for so long as the drug remained at the injection site. After sloughing at the injection site break-through occurred, mostly of *T. congolense*, the average protection being about 130 days. Two beasts which retained their drug depots were better protected, one for 309 days, the other for at least 405 days. A series of experiments, described in some detail, then suggested that the suramin should be dehydrated before being made up into the complex; that the intramuscular route would give less local reaction; and that the volume of the injection could be reduced either by using ethidium chloride in the complex or by freeze-drying and reconstituting the original ethidium bromide complex; the latter is described as "F.D.R." or, when at the minimal volume, as "F.D.R. tooth-paste" from its resemblance to that common product.

These findings were introduced in the second Phase II trial. Despite some quite severe local reactions neither skin necrosis nor sloughing developed, but almost half of the beasts lost weight and one-third of

them died within 6 months, showing gross tissue changes at the site of injection but no other constant pathological change except wasting. The freeze-drying process appeared to destroy much of the prophylactic activity of the complex and to lead to drug-resistant infections. Re-investigation of the subcutaneous route is in progress.

The Insect Vector

At the Ugbobigha field station attention is now concentrated on the *Glossina fusca* group. Much of the research described is in the early stages and should lead to a better understanding of the ecology of this group. The initial work permits description of the vegetational preferences of *G. tabaniformis* and *G. fusca*, indicates that the group is incorrectly designated as being crepuscular in habit, analyses the infection rates with *T. vivax* and *T. congolense*, and gives serological data on food preferences.

A comparative study was continued of possible contact between *G. palpalis* and man at two water holes, one in Ugbobigha in humid Southern Nigeria outside the known endemic area of human trypanosomiasis, the other near Kaduna in the drier Northern Nigeria within the endemic area, the objective being to record recaptures made after 18 days, the minimal period for infection to develop in the fly. The proportion of recaptured (and potentially infected) flies is 7 to 9 times greater in the north, where also the dry season proportion of re-captures, reflecting concentration of flies at permanent pools, is twice that of the wet season. Although, in the north, the actual number of re-captures is greater in the wet season, when fly density is maximal, at this season water holes are little used. These differences are held to go far towards explaining why sleeping sickness is so rarely found in the south.

Figures are given for the food preferences of *G. palpalis* and *G. morsitans* from areas near Kaduna. In addition to maintenance of a large colony of *G. palpalis*, attempts are being made to breed *G. morsitans* under laboratory conditions. Following on the finding that *T. gambiense* infection rates were higher in flies persuaded to feed within 24 hours of emergence, a technique was evolved, not without difficulty, for the anal feeding of tsetse. In later work infected blood will be used.

Those interested in the trypanosomiases should read the original report which gives an interesting picture of the application of new and old methods of research and shows the effort now being expended, at the rate of a mere £100,000 a year, to solve problems that cause untold economic loss and hinder the development of huge areas of Africa.

J. L. McLetchie

TANGANYIKA. **Medical Department. Sleeping Sickness Service Annual Report 1957** [APTED, F. I. C.]. 18 mimeographed pp. + 9 pp. of tables & 1 folding coloured map. 1957, Dec. Dar es Salaam: Director of Medical Services, P.O. Box 539, Tanganyika.

The map accompanying the report shows roughly the extent of the infected areas and the number of new cases of sleeping sickness derived from each area. 8 tables give details of geographical distribution, race, sex, age, occupation and season. The principal tables are for the 12-month period December 1956 to November 1957, but in 4 tables and in the text the figures are for the first 11 months of 1957.

New cases diagnosed totalled only 411, of which 376 were *T. rhodesiense* infections from numerous foci and 35 *T. gambiense* infections from two small lake-side areas. The total compares with 646 in 1956 and 923 in 1955. Most cases came from the Lake Province (105) and the Western Province (221). The three outstanding events of the year, all relating to the Lake Province, were the great improvement in Ngara where 103 cases were diagnosed in 1956 but only 26 in 1957; the comparatively few cases (28 in 1956 and 40 in 1957) together with signs of recession in the Maswa outbreak; and the somewhat disturbing evidence of persistence of infection in the Karagwe area of Bukoba. Minor threats elsewhere came to little or nothing. Full details, with comparative figures, are given for each infected province and district.

The service is centred on a small medical unit consisting of a doctor, 2 clerks, 2 African assistants who can do routine sleeping sickness investigations, and 11 orderlies mostly posted to districts and dispensaries. A number of settlement officers, provided by the Provincial Administration, organize bush clearance and other work in the numerous settlements; aided by their staff of scouts they also pinpoint infected places and actively trace cases. Provincial officers of the Tsetse Survey and Reclamation Department cooperate closely and are acknowledged as devoting a high proportion of their work to the control and prevention of sleeping sickness. With the aid of new techniques of discriminative clearing it is now policy, wherever possible, to attack the disease by opening up and developing country rather than to retreat from the fly behind settlement boundaries, and to plan long-term programmes on a provincial basis, integrating them with other production and development plans. Much anti-tsetse work, however, continues to be done in consolidating and improving old settlements, a few of which have, for a variety of reasons, been difficult to maintain. Thus, to take a few examples, discriminative clearing has, in the Western Province, linked up separate small settlements to form a large area of almost continuous occupation into which cattle may soon be introduced; in the Northern Province the Kiru area, evacuated in the 1944–46 outbreak, is being steadily re-opened to European settlement and will soon be almost all farmland again; and in the Eastern Province additional staff were posted to plan and start a three-year programme to stabilize unsatisfactory settlements in Ulanga.

The administration of prophylactic pentamidine was continued at Kagunga in the Western Province, where half of the 14 *T. gambiense* cases diagnosed were possibly infected in neighbouring Ruanda-Urundi.

To reduce the need for chemoprophylaxis, which is expensive and difficult with a shifting border population, it is proposed to spray with insecticide the rivers whose clearance proved impossible owing to rapid regeneration of the bush. Another pocket of *T. gambiense* infection was found 12 miles south of Kagunga but there was no evidence of further southward spread along the lake shore; periodic inspections are to be made to detect any such extension.

At Tabora Hospital 75 new patients were treated and old cases were followed up, including some considered incurable 5½ years before but then given Mel B. A trial was begun of Nitrofurazone in patients resistant to Mel B and comparison is being made of cerebrospinal fluid protein estimations done by the hallowed and internationally accepted Sicard-Cantaloube method and by the more rapid MRC wedge photometer. The new system of postcard notification is now working satisfactorily throughout the territory and is proving useful.

In the Northern Province 4 out of a total of 18 cases were in Europeans, and 2 other Europeans infected in the same Province went to a neighbouring territory for treatment. These all appeared to be chance infections. One was unresponsive to suramin and was treated with Mel B. [Such chance infections, occurring in Tanganyika and in other parts of Africa where the incidence of sleeping sickness is now very low, may become serious individual problems in that the possibility of trypanosomiasis may not be entertained until too late.]

[For 1956 Report, see this *Bulletin*, 1958, v. 55, 258.]

J. L. McLetchie

VAN DEN BERGHE, L. & LAMBRECHT, F. L. **Preliminary Note on the Biology of *Glossina vanhoofi* Henrard.** *Bull. Entom. Res.* 1958, June, v. 49, Pt. 2, 291–300, 1 text fig. & 2 figs. on pl.

HEULS, J., ORIO, J., CECCALDI, J. & MERVEILLE, P. Second rapport sur l'emploi de la Stylomycine dans le traitement de la trypanosomiase humaine à *T. gambiense*. [**Second Report on the Use of Stylomycin in *Trypanosoma gambiense* Infections**] *Bull. Soc. Path. Exot.* 1958, Jan.–Feb., v. 51, No. 1, 108–13.

This antibiotic has been shown to exert a trypanolytic action in animals [see this *Bulletin*, 1953, v. 50, 690; 1955, v. 52, 135; 1956, v. 53, 1103]. In man preliminary trials in cases of *Trypanosoma gambiense* sleeping sickness have been encouraging [see this *Bulletin*, 1955, v. 52, 615; 1957, v. 54, 271]. In this paper the authors further record their experience with the drug in the treatment of *T. gambiense* trypanosomiasis. It was given orally in capsules containing 100 or 250 mgm. of the compound to

a gross amount of 10 to 20 gm.; the dosage was every 12 hours over 7 to 14 days.

In 4 of 8 patients at the early, or lymphatico-sanguineous, stage of the disease the result was good over 13 to 24 months' observation; it was equally good in 2 of 6 patients at the meningeal stage; but it proved to be of no benefit in 6 patients at the late, or meningo-encephalitic, stage (all of whom had relapsed after previous treatments with other drugs).

A. R. D. Adams

Taube, E. & Nixon, L. C. **The Treatment of Advanced Trypanosomiasis rhodesiense with Mel B.** *Central African J. of Med.* 1958, Apr., v. 4, No. 4, 141–7.

Impressed by the successful use of Mel B in the treatment of *Trypanosoma rhodesiense* sleeping sickness recorded by Apted [see this *Bulletin*, 1957, v. 54, 541] the authors adopted his method for the treatment of 23 similar patients in N. Rhodesia. These were given two courses of intravenously administered Mel B, each of 4 days' duration, with an interval of 10–14 days between the courses. The dosage of drug in each course was 2 to 3·6 mgm./kgm. daily. In some cases suramin was given in the rest period. 5 of the patients, all very advanced in the disease, died soon after the treatment; 7 disappeared; and 11 have remained under supervision to date. Details of each of these 11 are given in the text, and the pertinent data are summarized in tables. In these tables comparable data from very similar cases treated with suramin and tryparsamide are set out collaterally for comparison and contrast.

Of a series of 87 consecutive patients treated with suramin and tryparsamide 71 are known to have died. Of the 10 treated with these 2 drugs, and recorded in the tables, 7 have died and 3 survived—but the period of observation of one of these latter is under 18 months.

The 11 patients treated with Mel B have all survived, and their general condition is satisfactory; in one there is mental clouding and in another a mask-like facies. The patient with mental abnormality is the only one to relapse (within 36 months' observation) after Mel B treatment, and has done so on 3 occasions. His cerebrospinal fluid protein content remains raised (56) and his cell count is also slightly raised (10)—before treatment 36 months earlier the figures were 80 and 33, respectively.

In 6 other patients remaining under surveillance for 3 years the figures have remained within normal limits during the last 2 years. The remaining 4 had normal fluids when last seen at 16 to 20 months (3 cases) and at 30 months (1 case). The results of treatment in every respect, therefore, are heavily in favour of Mel B, as opposed to Antrypol and tryparsamide, but observation must be continued to a total of 5 years before a final assessment can be made.

A. R. D. Adams

Lippi, M. & Benedetto, A. Variazioni della eucolloidità serica in corso di tripanosomiasi sperimentale della cavia da *Trypanosoma brucei*. [**Variations in the Equilibrium of the Serum Colloids during Experimental** *Trypanosoma brucei* **Infections in Guineapigs**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1958, Feb., v. 39, No. 2, 135–41. [37 refs.] English summary.

Lippi, M. & Grimaldi, S. Variazioni della resistenza osmotica leucocitaria in corso di tripanosomiasi sperimentale da *Trypanosoma brucei*. [**Variations in Osmotic Resistance of the Leucocytes during Experimental** *Trypanosoma brucei* **Infections**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1958, Mar., v. 39, No. 3, 185–90. [22 refs.] English summary (3 lines).

Lippi, M. & Grimaldi, S. Le granulazioni tossiche dei leucociti neutrofili nella tripanosomiasi sperimentale della cavia da *Trypanosoma brucei*. [**Toxic Granulations in Neutrophile Leucocytes during Experimental** *Trypanosoma brucei* **Infections in Guineapigs**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1958, Mar., v. 39, No. 3, 201–5. English summary (7 lines).

Lippi, M. & Sebastiani, A. Attività glutammico-ossalacetica e glutammico-piruvica del siero nella tripanosomiasi sperimentale della cavia da *Trypanosoma brucei*. [**Glutamic-Oxalacetic and Glutamic-Pyruvic Activity of the Serum in Experimental** *Trypanosoma brucei* **Infections in Guineapigs**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1958, Mar., v. 39, No. 3, 145–54, 1 chart. [25 refs.]

The English summary appended to the paper is as follows:—

"Both the oxalacetic glutamic and the pyruvic glutamic activity of the serum have been studied by the authors on the experimental trypanosomiasis of the Guinea-pigs from Trypanosoma brucei.

"In the course of the disease a definite and progressive rise of both the transaminasic activities was observed while the SGOT/SGPT tended to increase.

"These changes are thought to be due to the increasing lesions of the liver myocardium, adrenal and nervous tissue."

Godfrey, D. G. **Influence of Dietary Cod Liver Oil upon** *Trypanosoma congolense*, *T. cruzi*, *T. vivax* **and** *T. brucei*. *Exper. Parasit.* New York. 1958, May, v. 7, No. 3, 255–68, 7 figs.

Keppie [this *Bulletin*, 1954, v. 51, 33] had reported that *Trypanosoma congolense* did not develop normally in mice fed on a certain diet. The present paper shows that this partial suppression of development is due to the cod-liver oil in the diet which might be as high as 5·5%. Normal

development of trypanosomes could be produced by the addition to the diet of vitamin E (40 mgm. α-tocopherol per mouse on the day of inoculation), which neutralized the suppressive effect of the cod-liver oil. The development of the trypanosomes was also favoured by the presence of water soluble vitamins (B group). *T. vivax* was markedly suppressed by cod-liver oil in the diet, *T. brucei* was probably not suppressed, *T. cruzi* was certainly not suppressed.

This action of cod-liver oil upon trypanosomes is similar to that which has already been reported by Godfrey on *Babesia rodhaini* and *Plasmodium berghei* [*Exper. Parasit.*, 1957, v. 6, 465; this *Bulletin*, 1958, v. 55, 485]; it is believed that the host converts unsaturated fatty acids from cod-liver oil into peroxides, which interfere with the metabolism of the parasites, and that vitamin E prevents this conversion.

F. Hawking

e Sousa, M. O. Observações preliminares sôbre a doença de Chagas em Canal de São Simão (Estado de Goiás). [**Preliminary Observations on Chagas's Disease in Canal de São Simão, Brazil**] *Rev. Goiana Med.* 1957, Oct.–Nov.–Dec., v. 3, No. 4, 247–50, 2 figs.

The English summary appended to the paper is as follows:—

"*Triatoma infestans* was found to be the vector of Chagas disease in the city of Canal de São Simão, State of Goiás—Brazil. Five bugs out of 110 examined were found infected with *Schizotrypanum cruzi* (4·54%). The importance of Chagas disease in the region studied was emphasized."

Lausi, L. Diagnóstico de la enfermedad de Chagas. [**Diagnosis of Chagas's Disease**] *Semana Méd.* 1958, May 1, v. 112, No. 18, 694–9, 703.

An account and discussion, with illustrative cases.

Borges, C. Diagnóstico laboratorial da doença de Chagas. [**Chagas's Disease in the State of Goiás, Brazil. Laboratory Diagnosis**] *Rev. Goiana Med.* 1956, Oct.–Nov.–Dec., v. 2, No. 4, 279–86. [12 refs.]

The English summary appended to the paper is as follows:—

"1) From 174 patients of private clinics examined for the disclosure of Chagas disease, only 2 acute cases were observed and described and the anergic phase of these 2 cases was 7 and 25 to 30 days, respectively.

"2) The author states that the percentage of positive Machado-Guerreiro's tests could be higher if it were not for the false negative resulting from the immediate use of sheep red cells, and the rigorous criterion used for the interpretation of the test.

"3) Qualitative and quantitative techniques are compared and attention is called to the feasibility and sensitivity of the first, which was used for the present study.

"4) In 174 complement fixation tests, performed according to the technique suggested by Pellegrino and with the Davis' antigen, the results were 50% positive, 48·8% negative, and only 0·12% questionable tests.

"5) The diagnostic value of Machado-Guerreiro's test is emphasised when all the elements are standardized."

RASSI, A. & CARNEIRO, O. Estudo clínico, eletrocardiográfico e radiológico da cardiopatia chagásica crônica. Análise de 106 casos. [**Clinical, Radiological and Electrocardiographic Studies of Chronic Cardiopathy in Chagas's Disease**] *Rev. Goiana Med.* 1956, Oct.–Nov.–Dec., v. 2, No. 4, 287–96. [10 refs.] English summary.

In 18 months during 1955–1956 the authors, in Goiânia, Brazil, studied 106 cases of Chagas's disease from several areas of the State of Goiás. The diagnosis was made by means of the Machado-Guerreiro test. 68% of the patients were males and nearly one-third of the total were aged 31–40 years.

Cardiovascular symptoms were present in 79%: the predominant clinical features were extrasystoles and reduplication of the second pulmonary sound. Congestive heart failure was detected in 13 and right-sided failure in 6. In 86 patients examined by X-ray, 54 showed a normal heart outline, while slight, moderate and great enlargement were found in 9, 13 and 10 respectively; the normal heart outline is contrasted with the frequent alteration in conductivity. There were 89 (84%) of abnormal electrocardiograms: the commonest changes were ventricular extrasystoles (52·83%) and typical right bundle branch block (40·56%). There were 34 cases of megaoesophagus and 6 of megacolon. 8 patients died, 6 of them suddenly. Treatment was purely symptomatic.

H. J. O'D. Burke-Gaffney

DE REZENDE, J. M. Megaesôfago por doença de Chagas. [**Chagas's Disease in the State of Goiás, Brazil**] *Rev. Goiana Med.* 1956, Oct.–Nov.–Dec., v. 2, No. 4, 297–314, 6 figs. [37 refs.]

The English summary appended to the paper is as follows:—

"1) The author studies the relationship between Chagas disease and megaesophagus and concludes that Chagas disease is responsible for the high incidence of this trouble in Brasil.

"2) Machado-Guerreiro's test was performed in 85 patients with megaesophagus taken, without selection, from 170 cases, and a positivity rate of 85·90% was found.

"3) Electrocardiograms were taken from 50 patients (46 of them with positive Machado-Guerreiro's test), resulting in 22 normal and 28 abnormal electrocardiograms. The latter showed predominantly ventricular premature beats and right bundle branch block.

"4) Looking at the geographic distribution of the patients, it was found that the bulk of them came from areas where the triatomid bugs showed high natural infection index by Schizotrypanum cruzi.

"5) The author proposes that the digestive form be considered as an individual clinical form of Chagas disease where there would be included patients with only digestive manifestations of the disease."

Ribeiro, I. B. Forma aguda da doença de Chagas em Ceres. Resultados de diversos tratamentos empregados. [**Acute Form of Chagas's Disease. Result of Various Treatments**] *Rev. Goiana Med.* 1957, Jan.–Feb.–Mar., v. 3, No. 1, 3–20, 6 figs. [10 refs.]

The English summary appended to the paper is as follows:—

"The author refers to his observations made in Ceres, State of Goiaz, Brazil, on the acute form of Chagas disease and the various treatments he has tried. He emphasises the value of the Romaña's sign as an important symptom for the early diagnosis of the disease. He presents 6 acute cases of benign course.

"As treatment he used experimentally oxytetracycline in 3 cases, pyretotherapy in one and oxy or tetracycline + 'Spirotripan' in two. He observed a steady attenuation of the symptoms in all cases treated with oxytetracycline, probably by trypanosomostatic action of oxytetracycline, the diminishing of the bipalpebral oedema being a constant fact by the second day of treatment. However, the drug proved to be inefficient to eradicate the parasites, as shown by parasitologic tests. The cases treated with 'Spirotripan' showed negative xenodiagnostic tests during the treatment but the complement fixation test remained positive. 'Spirotripan' seems to have a trypanosomicide action on the blood forms of T. cruzi, but it had no sterilizing action on the infected organism."

Seneca, H., Sang, J. B. & Troc, A. K. **The Electrophoretic Pattern of the Serum Proteins in Experimental Haemoflagellate Infections.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, May, v. 52, No. 3, 230–34. [13 refs.]

The increased serum globulin and lowered serum albumin have long been recognized in kala azar. There appears to be a species difference in relation to the alteration of the various serum fractions. The corresponding changes in the serum of the host during trypanosome infections are not so well known.

The present investigation on the electrophoretic behaviour of serum proteins of the host during experimental haemoflagellate infections was undertaken in order to compare that in *T. cruzi* infections, about which nothing appears to be known, with that in other infections of this type. Sera from hamsters infected with *L. donovani*, *T. rhodesiense* and *T.*

gambiense, and sera from guineapigs, rats and mice infected with *T. rhodesiense*, were used. The sera from dba mice infected with *T. cruzi* were also used. Electrophoretic studies were made in the Tiselius apparatus, model 38.

The electrophoretic patterns of the sera of normal animals used are given and also those obtaining during different stages of the various infections. In hamsters the greatest fall in serum protein occurred during leishmania infection. Albumin was generally reduced and alpha globulins raised to varying degree in the different infections, and the value for beta and gamma globulins varied in direction and amount. The authors suggest that "Apparently *Leishmania donovani* is the most primitive member, the African trypanosomes the connecting link, and *Trypanosoma cruzi* the most advanced member of haemoflagellates".

J. D. Fulton

Torres, C. M., Gonçalves, N. B., Tavares, B. M. & Gonçalves, F. L. Ação da N_1-Sulfanilil-N_2-n-Butilcarbamida (BZ 55) sôbre a miocardite intersticial produzida pelo *Schizotrypanum cruzi*. [**Action of N_1-Sulphanilyl-N_2-n-Butylcarbamide (BZ55) in Interstitial Myocarditis produced by** *Trypanosoma cruzi*] *Anais Acad. Brasileira de Ciências.* 1957, Dec. 31, v. 29, No. 4, 557–60, 6 figs. on 2 pls.

The English summary appended to the paper is as follows:—

"Interstitial myocarditis induced in Swiss albino mice by Y strain of *Schizotrypanum cruzi* is favorably influenced by oral administration of N_1-sulfanilil-N_2-n-butilcarbamida (BZ55), (12·5–25 mg per male Swiss albino mouse).

"Previous experience revealed that the reading of the results should be done 14–17 days after inoculation when the natural capacity of reversion of the interstitial myocarditis is less marked."

LEISHMANIASIS

In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.

Gherman, I., Zaharia, C. A., Bîrzu, I., Popescu, G. & Țiereanu, E. Considerații epidemiologice asupra primului episod epidemic de leishmanioza infantilă din țara noastră. [**Epidemiological Considerations on the First Epidemic Episode of Infantile Leishmaniasis in this Country**] *Microbiol., Parazitol. și Epidemiol.* Bucharest. 1957, Nov.–Dec., v. 2, No. 6, 556–60, 4 plans.

A description is given of a focus of infantile leishmaniasis in the Craiova region of Rumania in which 24 cases occurred, the distribution

of which is shown in sketch maps. The diagnosis was established by parasitological investigations in 7 cases and retrospectively in the remainder. 7 patients (29%) were children under 1 year old; the remainder were children aged up to 7 years, except for 1 adult aged 33. Only 1 patient lived in a good social and hygienic environment. The duration of illness at the time of investigation was between 6 and 12 months in 11 cases (55%). No fresh cases were detected in an examination carried out in 1955 of the child population aged up to 6 years in the affected localities. *D. J. Bauer*

Chatterjee, A. N., Ray, J. C. & Ghosh, J. J. **Hexokinase Activity in Cell-Free Extracts of** *Leishmania donovani*. [Correspondence.] *Nature*. 1958, July 12, v. 182, 109–10.

Forratini, O. P. & de Oliveira, O. Um foco de leishmaniose tegumentar na zona Sul do Estado de São Paulo, Brasil. [**Focus of Cutaneous Leishmaniasis in an Area South of the State of São Paulo, Brazil**] *Arquivos Facul. de Hig. e Saúde Pública Univ. de São Paulo*. 1957, June, v. 11, No. 1, 23–34, 2 maps & 10 figs. [10 refs.]

The English summary appended to the paper is as follows:—

"The authors report the finding of an endemic area of Cutaneous Leishmaniasis in a mountain region of the Municipio de Jacupiranga, in the South of the State of São Paulo, Brazil. They have observed four active cases with cutaneous lesions, a case that was already treated at the Hospital of Santa Casa of Santos and three cases having cicatricial lesions with positive intradermal reaction of Montenegro. Mucous lesions were not found. By this finding, in a region of the State that was considered until now as not having that parasitosis, the authors call attention to need of an epidemiological study in all the State of São Paulo, Brazil."

FEVERS OF THE TYPHUS GROUP

In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.

Weiss, E. & Dressler, H. R. **Growth of** *Rickettsia prowazeki* **in Irradiated Monolayer Cultures of Chick Embryo Entodermal Cells.** *J. Bacteriology*. 1958, May, v. 75, No. 5, 544–52, 8 figs. [16 refs.]

Exposure of monolayer cultures of chick embryo entodermal cells to doses of 10,000 to 100,000 r of ^{60}Co gamma radiation 8 to 18 hours before

inoculation with *Rickettsia prowazeki* did not affect growth of the organisms (assessed by microscopic examination and egg infectivity titrations of irradiated and non-irradiated cultures over 7 days). Doses of 150,000 to 300,000 r produced increasing degrees of cellular injury; this was associated during the first few days of infection with a greater release of rickettsiae into the media than occurred in control cultures, probably resulting from more rapid lysis of irradiated host cells.

[See also this *Bulletin*, 1957, v. 54, 23.] *R. S. F. Hennessey*

Krasnik, F. I. **Notes on the Characteristics of Rickettsiae Isolated in Sporadic Typhus.** *Acta Virologica.* Prague. 1958, Jan.–Mar., v. 2, No. 1, 12–21. [15 refs.]

"1. In a study of the biological characteristics of Rickettsiae isolated from the blood of patients with sporadic typhus it was shown that in animal experiments (guinea-pigs, white mice) these strains produced a picture typical for the agent of epidemic typhus.

"2. Mice immunized with these strains of Rickettsiae became resistant to the intravenous injection of 2–4 lethal doses of toxic material from *R. prowazeki* and were considerably less resistant to *R. mooseri.*

"3. A serological analysis of the antigenic structure of the Rickettsiae using agglutinin absorption tests showed that strains isolated from the blood of patients in sporadic and also second cases of typhus did not differ biologically or in antigenic structure from standard strains of epidemic typhus (Breinl) and must be classed with *R. prowazeki.*"

Combiescu, D., Dumitrescu, N., Zarnea, G., Botez, V., Saragea, A. & Ionescu, H. Studiul comparativ al seroreacţiilor de diagnostic în tifosul exantematic şi importanţa lor epidemiologică. [**A Comparative Study of Diagnostic Serological Reactions in Exanthematic Typhus and of their Epidemiological Importance**] *Studii şi Cercetări Inframicrobiol., Microbiol. şi Parazitol.* 1957, v. 8, No. 3, 313–21. French summary.

The authors have compared the efficacy of the Weil-Felix reaction, the Kudicke-Steuer reaction and the complement-fixation test with rickettsial antigen in the examination of sera from 7 persons who had suffered from typhus 39 days to 4 years previously, 24 contacts and 18 healthy persons who had not been in contact with the infection. The Kudicke-Steuer reaction was positive in 3 of the 7 persons who had suffered from typhus, and titres of 25–4,000 were obtained in the Weil-Felix reaction and of 16–256 in the complement-fixation test. The complement-fixation test was negative in 14 contacts and 18 healthy persons, and the Kudicke-Steuer test was negative in all persons in the 2 groups. Similar examinations, the results of which are presented in tables, were carried out on 71

schoolchildren, 20 of whom were subfebrile at the time of examination, and on a number of smaller groups of healthy persons and persons suffering from typhus, and from the combined results of all the investigations it is concluded that the complement-fixation test gives the most useful results in the diagnosis of typhus. *D. J. Bauer*

McLintock, J., Zeini, A. & Djanbakhsh, B. **Development of Insecticide Resistance in Body Lice in Villages of North-Eastern Iran.** *Bull. World Health Organization.* Geneva. 1958, v. 18, No. 4, 678–80.

Measures have been taken to investigate ways of controlling human body lice, vectors of epidemic typhus in Iran. These studies were made in 28 villages of the Sabzewar region where the numbers of the population infested with lice varied from 25% to nearly 100%.

In each village as many persons as possible, and also bedding, clothes and carpets, were dusted with 10% DDT or 1% gamma BHC dusts. These were applied at an average of 51 gm. per person with hand dusters. The most satisfactory results were obtained when this procedure was carried out once a week for 4 weeks. It was noted that DDT brought the percentage of persons infested to slightly lower levels than BHC.

Some months after these measures were started, resistance to BHC developed in several villages. No DDT resistance was noted. It is interesting that resistance developed in those villages where BHC had been applied either once a week for 4 weeks, or once a week for 3 weeks and then once a month for 5 months; but not where it was applied 4 times at fortnightly intervals. Hence it is concluded that the frequency at which the insecticide was applied played some part in the development of a tolerance to it.

In two villages there was some indication that the lice population dusted with BHC had developed a slight resistance to DDT.

R. J. Wood

Yu, En-Shu & Lin, She-Gin. [**Study on the Condition of Natural Infection with *R. tsutsugamushi* among Mites and Domestic Animals in Fukien**] *Acta Microbiol. Sinica.* Peking. 1957, v. 5, No. 4. 425–32, 1 graph. [16 refs.] [In Chinese.] English summary. [Summary taken from *Rev. Applied Entom.* Ser. B. 1958, June, v. 46, Pt. 6, 98–9.]

In the course of a search for vectors and reservoirs of tsutsugamushi disease in various districts of Fukien between 1953 and 1957, strains of *Rickettsia orientalis* (*tsutsugamushi*) were isolated from *Trombicula deliensis* Walch, *E*[*uschöngastia*] *indica* (Hirst), *Acomatacarus* sp. and

Walchia sp. and from rabbits, pigs, rats (*Rattus losea*, *R. norvegicus* and *R. rattus*), mice (*Mus musculus* and *M. bactrianus kakhyenensis*) and a shrew (*Suncus murinus*).

CHITI, E. Terapia della febbre bottonosa. [**The Treatment of Boutonneuse Fever**] *Giorn. di Malattie Infettive e Parassit.* 1958, May, v. 10, No. 5, 403–10. [41 refs.]

This is a report of cases of tick-bite fever [boutonneuse fever] treated by chloramphenicol in the isolation pavilion of the Genoa Civil Hospital between 1949 and 1950, which had been followed up for 7 years. 42 patients (24 male and 18 female) of various ages [not given] were treated. Nearly all were living in sanitary conditions which were only moderately satisfactory, and the majority had animals, mostly dogs, or were in contact with them.

A table summarizes the clinical details, giving onset, fever, exanthem, etc., together with the treatment given. The chloramphenicol was given in 0·25 gm. doses by mouth except in 3 severe cases where it was given intramuscularly; the average total dose was 11–12 gm.

Although admittedly the disease usually runs a favourable course and there was only 1 fatal case in the series (a woman of 72) the author states that the course of the disease was materially shortened, defervescence by crisis or rapid lysis taking place within 5 days of starting the chloramphenicol treatment. He considers that although this antibiotic and chlortetracycline are the antibiotics of choice for this disease, the former is to be preferred because it is cheaper. The steroids and phenylbutazone can be added if required. *W. K. Dunscombe*

DE MAGALHÃES, O. Contribuição para o conhecimento das doenças do grupo "Tifo Exantemático" no Brasil (Tifo Exantemático Neotrópico). [**Observations on Neotropical Exanthematic Typhus in Brazil**] *Mem. Inst. Oswaldo Cruz.* 1957, Dec., v. 55, No. 2, 191–208, 4 maps (3 folding coloured), 12 figs. & 1 chart. English summary.

An account of a case, discussion and study of 2 outbreaks, in 1950 and 1956, respectively.

SYRŮČEK, L., SOBĚSLAVSKÝ, O. & GUTVIRTH, I. **Isolation of** *Coxiella burneti* **from Human Placentas.** *J. Hyg., Epidemiol., Microbiol. & Immunol.* Prague. 1958, v. 2, No. 1, 29–35, 4 figs. [21 refs.]

"In 1956 and 1957, on the basis of earlier epidemiological investigations, the authors examined five women who had had Q fever in 1954,

and tried to culture the micro-organism from their placentas and milk. Cows with which the women came into contact in their work were the source of the causative agent. The time which elapsed between infection and delivery ranged from 2 years and 8 months to 3 years and 2 months. The authors isolated *Coxiella burneti* from the placenta of three of the women and from curettage material from another, in whom pregnancy was interrupted in the third month because of rubeola. In one woman attempts to isolate Coxiella from the placenta bore negative results, and in two women the results of attempts to isolate the micro-organism from the milk were also negative. Of the women in whom the results were positive, three were pregnant for the first time following Q fever and one for the second time. With one exception (partus praematurus imminens in the eighth month), no complications developed during pregnancy in any of these women. In all four cases delivery was uneventful, ending in the birth of a healthy infant, and the postpartum period was also free from complications. In the discussion the authors deal with the question of the possibility of reinfection during pregnancy. In the four women from whose placentas positive cultures of *Coxiella burneti* were obtained, this eventuality was excluded in one woman only. No clinical signs of reinfection, however, were observed in any of the others."

SHINDAROV, L. **A Combined Method** (*in vivo* **and** *in vitro*) **of cultivating Rickettsiae used for the Production of Corpuscular Antigen from** *Rickettsia burneti*. *Acta Virologica*. Prague. 1958, Jan.–Mar., v. 2, No. 1, 62–4.

Improved yields of rickettsial antigen (*Rickettsia burneti* and *R. conori*) were obtained by culturing the organisms in the chick embryo yolk sac for 7–11 days, removing the yolk sacs, cutting them in small pieces, and incubating the pieces for 5 days in a nutrient medium containing Hanks solution, inactivated horse serum and chick embryo extract. Mean increases in antigen yield (measured optically after purification) were 3·7-fold for *R. burneti* and 3·3-fold for *R. conori*, as compared with yields obtained from yolk sac growth alone. The antigens reacted satisfactorily in agglutination and complement-fixation tests. *R. S. F. Hennessey*

YELLOW FEVER

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.

SMITH, C. E. G. **The Distribution of Antibodies to Japanese Encephalitis, Dengue, and Yellow Fever Viruses in Five Rural Communities in Malaya.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, May, v. 51, No. 3, 237–52, 6 figs. [32 refs.]

Neutralization, haemagglutinin-inhibition and complement-fixation tests for antibodies to Japanese encephalitis, dengue and yellow fever viruses were performed on sera collected from members of 5 rural communities in contrasting environments in Malaya. These comprised Malays in a rice-growing valley (50 sera), on a coastal rice-growing plain (51), and in a coastal swamp (59); Jakun aborigines in a forest fringe (54); and Senoi aborigines in a mountain area at an altitude of between 4,500 and 5,000 feet (49). The incidence of neutralizing antibodies to Japanese encephalitis virus among persons over 10 years of age was about 80% in the coastal communities, 60% in valley and forest fringe communities, and 10% in the mountain community. Neutralizing antibodies to both dengue viruses were found in about 90% of sera from persons aged over 10 years in all communities except that in the mountain area, where the incidence of dengue-1 antibody was significantly lower (74%). The results of haemagglutinin-inhibition tests suggested that this test was probably capable of detecting about 90% of sera containing neutralizing antibody in an area where only 1 arborvirus occurred; the complement-fixation test was mainly of value as an indicator of the general frequency of infections in a community. Neutralizing antibody to yellow fever virus was found in about one-third of the sera examined; the proportion of positive sera was related to the number of other B viruses to which neutralizing antibody was present, the yellow fever positives probably being due to cross-reaction.

The incidence of neutralizing antibodies to Japanese encephalitis and dengue-1 viruses was consistent with infection rates of 3–10% and 7–15% per annum respectively, for communities outside the mountain area.

R. S. F. Hennessey

GILLETT, J. D. **Laboratory Tests on the Maintenance of Yellow Fever Virus in certain Predatory Arthropods.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, May, v. 52, No. 3, 269–71. [11 refs.]

In the search for reservoirs of yellow fever virus to account for its survival in isolated strips of forest where there are few monkeys, and periods of the year with few mosquitoes [this *Bulletin*, 1951, v. 48, 627], attempts were made to infect predatory arthropods by feeding them on

infected mosquitoes [*ibid.*, 1939, v. 36, 638; 1940, v. 37, 93]. Spiders and Emesine bugs from the Zika forest, Uganda, were fed on *Aëdes aegypti* or *Aëdes africanus* infected at least 18 days before by feeding on a monkey circulating virus in high titre. No yellow fever virus was isolated from the spiders on any of 7 occasions between 3 and 47 days after feeding; or from the bugs on any of 8 occasions between 8 and 127 days after feeding. Yellow fever virus does not therefore seem likely to survive in nature in spiders or Emesine bugs. *C. E. Gordon Smith*

Boiron, H. & Camain, R. Le cobaye est sensible à l'ultra-virus amaril neurotrope injecté par voie parenterale. [**The Guineapig is Sensitive to Parenteral Inoculation of a Neurotropic Yellow Fever Ultravirus**] *Bull. et Mém. École Nat. Méd. Pharm. de Dakar.* 1957, v. 5, 272–8. [10 refs.]

The English summary appended to the paper is as follows:—

"Guinea-pig is sensitive to parenteral inoculation of a neurotropic yellow fever ultra-virus. Virus was recognized several times and during several days in the blood and various organs of the guinea-pig; besides, it provokes formation of antibodies. Inoculated animal does not show any symptoms; we are in presence of an inapparent infection."

DENGUE AND ALLIED FEVERS

Weinbren, M. P.; Haddow, A. J.; Williams, M. C. **The Occurrence of Chikungunya Virus in Uganda. I. Isolation from Mosquitoes** [Weinbren, Haddow & Williams]. *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, May, v. 52, No. 3, 253–7. **II. The Occurrence of Chikungunya Virus in Man on the Entebbe Peninsula** [Weinbren]. *Ibid.*, 258–9. **III. Identification of the Agents** [Weinbren]. *Ibid.*, 259–62.

Virus was isolated in suckling mice from a pool of 78 *Aëdes africanus* caught on a platform in the Zika forest, Uganda. Adult mice were unaffected but the sucklings were either sick or dead on the 3rd day after inoculation. The virus was successfully re-isolated in suckling mice. The agent passed a Seitz EK filter. A monkey inoculated with the mosquito suspension showed fever, excitability, and pallor of the face: it had viraemia and developed neutralizing antibodies. 2 of the mosquito catchers had dengue-like illnesses and virus was isolated from the blood of one of them on two occasions; the other was shown by antibody studies to have an infection with the same virus. Infected mice had encephalitis,

skeletal myositis and myocarditis. The virus was ether-sensitive. Neutralization tests showed that both the viruses (of mosquito and human origin) were identical with Chikungunya virus [this *Bulletin*, 1956, v. 53, 1334, 1335]. *C. E. Gordon Smith*

RABIES

Butcher, L. V. **The Present Status of Paralytic Rabies (Bat-Transmitted) in Trinidad.** *West Indian Med. J.* 1958, Mar., v. 7, No. 1, 17–20.

In Trinidad, where, owing to a strictly enforced control programme, canine rabies has been non-existent for several years, there occurred among cattle in 1925 an outbreak, in epizootic form, of a fatal disease in which the predominating symptom was paralysis. This outbreak was followed in 1929 by the occurrence among the human population of a similar disease, which caused 13 deaths. The aetiology of the disease remained obscure until 1931 when, after observations on the island's bats had revealed behaviour peculiarities suggesting a possible relationship between these animals and the spread of infection, it was definitely established that the bats were vectors of a rabies virus which, on further laboratory investigation, proved capable of transmission to guineapigs, rabbits, dogs and calves [this *Bulletin*, 1936, v. 33, 742; 1937, v. 34, 677].

Between 1929 and 1937, when the last case was reported, there were 89 human deaths from this bat-transmitted paralytic rabies. Among livestock, particularly among cattle, the disease continued in sporadic form until 1953, when it again assumed epizootic proportions. As a result a permanent programme of control was formulated, one which at first envisaged a routine mass vaccination campaign, in conjunction with intensive bat destruction measures. Since 1955, when a Paralytic Rabies Control Committee was set up to implement the approved policy, field work has centred on mass vaccination of cattle rather than on bat destruction. The objective of the vaccination campaign, in which a modified live virus avianized preparation is used, has been to establish and maintain an immunized cattle population resistant to the attack of rabies-infected bats. The success of the campaign, which has been coordinated with a continuous and energetic education programme, is reflected in the reduction of rabies among cattle since 1954, when there were 270 cases; in 1955 there were 22, in 1956 only 3, and in 1957 there was but one.

As regards the distribution of the rabies virus among the island's *Cheiroptera*, bat surveys have led to the identification of over 50 species, of which 7, other than the common vampire bat, have been found to be

infected with the virus; of these 7, 3 are insectivorous, 3 are fruit-eating and 1 is blood-sucking.

[The species of bats involved in the transmission of rabies are strictly haematophagous; there is no direct evidence to date of natural transmission of rabies from non-haematophagous bats to man or lower animals.] *G. Stuart*

Piskareva, N. A. **Antigenic Differences between Fixed and Street Strains of Rabies Virus.** *Acta Virologica.* Prague. 1958, Jan.–Mar., v. 2, No. 1, 41–51. [18 refs.]

"1. Two fixed and 11 street strains of rabies virus were studied. Sufficiently distinct antigenic differences were found between these strains.

"2. It is expedient to use immune sera obtained by immunizing animals with street virus for the sero-prophylaxis of hydrophobia."

Nikolitsch, M. Die Tollwutkrankheit des Menschen ist eine hohe Intoxikation des vegetativen Nervensystems. [**Rabies in Man—an Intoxication of the Vegetative Nervous System**] *Arch. f. Hyg. u. Bakt.* 1958, May, v. 142, No. 3, 198–205.

In this paper the author discusses his view that the disturbances of function which become manifest in rabies infection result from toxic constituents of the virus which are set free when the virus dies and are not due to the multiplication of the living virus bodies. In support of his view he presents some results of his work on rabies in experimental animals and describes the clinical picture of rabies in man. It is maintained that all the cardinal and other symptoms and signs in the different types of rabies can be explained as resulting from an intoxication of the vegetative nervous system. Each symptom is described and analysed in respect of the pathological mechanism whereby it has been brought about. The therapy of established rabies infection is either useless or nearly so. hence efforts should be made to produce a chemotherapeutic agent which would detoxicate the rabies endotoxins. *M. E. Delafield*

Jelesić, Z. Kongenitale Missbildungen und das Tollwutvirus. [**Congenital Malformations and Rabies Virus**] *Arch. f. Hyg. u. Bakt.* 1958, Feb., v. 142, No. 1, 8–13, 2 figs. [21 refs.]

Among over 600 cases of rabies reported to the Pasteur Institute in Novi Sad, Yugoslavia, between 1929 and 1956, there was one instance of the onset of rabies at the time of parturition, and 2 instances in which the symptoms developed 4 and 7 days after parturition respectively. One

child was physically retarded and died after 6½ months, one survived, with poor physical development and astigmatism, and the child of the third mother died of bronchopneumonia after 14 months and no further details could be obtained. In one case exposure to infection occurred late in pregnancy, in one it was unknown, and in one it occurred apparently 2–3 months before conception, and the possibility arises that rabies virus may adversely affect the development of the foetus. The teratogenic properties of the virus were investigated in chick embryos. 7 fertile eggs were infected with rabies virus in the yolk sac after 90 hours of incubation, and the embryos were removed and examined on the 18th day; 6 embryos showed no abnormalities and the brains contained no virus, but 1 showed agenesis of one eye and complete eventration, and rabies virus was recovered from the brain by the intracerebral inoculation of mice.

D. J. Bauer

Aubertin, E. La rage. I.—Rappels épidémiologiques. *J. Méd. de Bordeaux*. 1958, June, v. 135, No. 6, 619–20. II.—Indications du traitement antirabique. *Ibid.*, 621–2. III.—La vaccination antirabique. *Ibid.*, 623–4. IV.—La séro-prévention antirabique. *Ibid.*, 625–6. [V.]—Tableau récapitulatif des indications du traitement antirabique. *Ibid.*, 627–8. [**Rabies. I.—Epidemiological Aspects. II.—Indications for Antirabies Treatment. III.—Antirabies Vaccination. IV.—Seroprophylaxis of Rabies. V.—Table of Indications for Antirabies Treatment**]

Constantinesco, N. & Birzu, N. Phénomène d'autosterilisation et guérison dans la rage expérimentale. [**Autosterilization and Recovery in Experimental Rabies**] *Ann. Inst. Pasteur*. 1958, June, v. 94, No. 6, 739–47, 1 fig. [22 refs.]

According to Levaditi's theory of self-sterilizing neuro-infections (*C.R. Soc. Biol.*, 1928, v. 98, 911), certain affections of the neural axis due to neurotropic ultra viruses may be capable of causing death when the nervous system is no longer virulent. In such cases the histopathological changes produced by the affected animal's defence mechanism are of such intensity as to be incompatible with life. Infections in which the phenomenon of autosterilization has been observed include herpes, poliomyelitis, Borna's disease and rabies. In its application to rabies this phenomenon has been studied by Constantinesco and his collaborators since 1943 [see, for example, this *Bulletin*, 1955, v. 52, 1188; 1956, v. 53, 879; 1958, v. 55, 501]. Results of their previous investigations had shown that in man and in animals dying of rabies despite vaccination street virus was absent from the peripheral nerves and, in consequence, from the salivary glands, and that in certain animals, which had died of paralytic rabies

despite vaccination prior to intracerebral challenge, virus was absent from the central nervous system. Moreover in groups of rats and mice, certain of the vaccinated animals, which after intracerebral challenge had developed paralytic rabies, recovered from the disease.

In the present paper the authors (a) compare the virulence of the brain in vaccinated and unvaccinated mice affected with paralytic rabies, and (b) investigate the nature of the paralysis in mice, in which the central nervous system is avirulent (LD50 = 0).

With respect to (a), immunization was carried out with one or other of the following preparations: a Semple-type phenol-inactivated vaccine, a Fermi-type vaccine, and a phenol-attenuated vaccine administered while still virulent ($LD50 = 10^{-2.7}$) for the brain of the mouse. Challenge was effected intracerebrally with widely varying doses of Babès fixed virus. After vaccination certain of the animals proved wholly refractory to challenge (complete immunity), others developed encephalitis, with a prolonged paralytic phase, and in these animals the survival period exceeded 10 days (partial immunity), while others exemplified a cured paralytic rabies, characterized by neuro-muscular sequelae (with loss of function), comparable with those seen in human poliomyelitis (recovery). The proportion of vaccinated mice becoming refractory, surviving more than 10 days (with the central nervous system completely avirulent), or recovering varied with the efficacy of the vaccine and the severity of the challenge. The frequency with which autosterilization of the brain occurred was governed by the efficacy of the vaccine used. Thus, while among the controls and among the mice treated with phenol-inactivated vaccine, in which animals encephalitis developed 4–9 days after challenge, virulence in the brain ranged from $10^{-6.5}$ to $10^{-11.3}$ LD50 and in only 4 (18%) of 22 vaccinated mice was the brain avirulent; among animals treated with Fermi vaccine and a live phenolized vaccine, respectively, and surviving more than 10 days after challenge, autosterilization was complete in 19 (63%) of 30 and in 30 (73%) of 41 mice. That the autosterilization process was not conditioned by the amount of the challenge dose was proved by the fact that, whereas in mice immunized with Fermi vaccine or live phenolized vaccine the organism proved capable of destroying massive doses of fixed virus (10^4–10^5 LD50) given intracerebrally, in mice treated with phenol-inactivated vaccine and challenged with but 10–10^2 LD50 of fixed virus intracerebrally, the brain revealed a very high virus content, *viz.* 10^{-6}–10^{-10} LD50.

With respect to (b), it was found that in animals with a prolonged paralytic phase of 18–20 days and with complete avirulence of the brain, the histological changes were of an inflammatory nature, with perivascular cuffing, and degenerative processes in the neurons of Ammon's horn; in no case was there any evidence of the demyelination characteristic of the histology in neuroparalytic accidents, which occasionally complicate anti-rabies treatment. Further it has to be noted that the above type of paralysis in vaccinated animals is observed only after challenge, the

frequency of occurrence of such paralysis being strictly conditioned by the efficacy of the vaccine and the route by which the challenge virus is administered. Thus, according to the authors, " the paralytic syndrome in animals, the central nervous system of which has become avirulent, is actually a rabic one, and differs from ' allergic nervous accidents ' with demyelinization, due to antirabic treatment ". *G. Stuart*

PLAGUE

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, rodent hosts, transmission, pathology, diagnosis, clinical findings, treatment, control.

Baroian, O. V. **World Distribution of Plague during the Twentieth Century.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1957, v. 28, Nos. 5/6, 897–904, 8 figs. [Translated from Russian.]

Brygoo, E. R. & Gonon, M. Une épidémie de peste pulmonaire dans le Nord-Est de Madagascar. [**An Outbreak of Pulmonary Plague in North East Madagascar**] *Bull. Soc. Path. Exot.* 1958, Jan.–Feb., v. 51, No. 1, 47–58. [14 refs.]

The east coast of Madagascar became infected with plague in 1898. Afterwards there were periodical epidemics in different parts due not to fresh importation of the disease, but to persistence of infection on the island. Tamatave, where the original epidemic took place, had its last epidemic in 1929. After that year plague persisted only in the central high plateau and its eastern spurs, but since 1948 it has appeared in the northern, southern and south-eastern spurs of the plateau. Bealanana, one of the northern spurs, has been a known epidemic focus of bubonic plague since 1948 [this *Bulletin*, 1956, v. 53, 1336]. From there, at the end of September 1957, a 27-year-old man named Rav set out to visit his family in Doany. This canton lies in a remarkably isolated mountain valley, communications of which consist of a footpath and a dry-weather air-field.

Rav fell ill while on his journey, was taken to Doany by his uncle, and died on the 28th September. 5 days later his mother died, and the uncle died on the following day. The health authorities became aware of an outbreak and reached Doany by air at the end of October, by which time 35 persons had died of pneumonic plague. 6 more, suffering from primary pneumonic plague, were treated with streptomycin, 24 to 28 gm.

in 9 to 13 days: all recovered, though in one case the plague pneumonia gave place to a pneumococcal pneumonia requiring chloramphenicol treatment. 103 contacts were isolated and treated with sulphadiazine, 6 gm. daily for 6 to 8 days, and no more cases developed. The canton was placed under quarantine. Rav's illness evidently was bubonic plague with a terminal pneumonic phase. The other cases, all primary pneumonic plague, belonged to 5 families, 4 of them close relations of his, the fifth that of his medicine man. (The complete epidemic is traced, case by case, in two tables.)

The last important epidemic of primary pneumonic plague occurred in 1945. It may appear at any time of the year, but only when the minimum temperature has dropped to below 14°C. for 8 days previously. Cases of primary pneumonic plague therefore are seen only exceptionally near the coast, but this form of the disease is seen frequently on the high plateau. Possibly an abrupt fall in temperature is even more important than the critical minimum.

The chief of Doany recalled a similar illness in 1952, that ended of its own accord after causing 3 deaths. The severity of the present outbreak was probably due to its occurrence in a population not normally in contact with plague and never vaccinated. While it is admitted that EV vaccine does not afford full protection against pneumonic plague, it is considered likely that repeated mass vaccination has been at least partly responsible for the cessation of the epidemics of primary pneumonic plague that used to afflict the high plateau. *B. B. Waddy*

Bessmertnyi, B. S. **Epidemiology and Prophylaxis of Plague in Countries of the African and American Continents (1939–53).** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1957, v. 28, Nos. 5/6, 904–8. [Translated from Russian.]

Tumanskii, V. M. **The Classification of Variants of the Plague Microbe.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1957, v. 28, Nos. 5/6, 776–80. [Translated from Russian.]

"(1) Strains of plague bacilli differ from one another according to their ability to ferment glycerol and form nitrites.

"(2) The fact of the existence in nature of three groups of strains of plague bacilli, viz. not fermenting glycerol but forming nitrites, fermenting glycerol and forming nitrites, and fermenting glycerol but not forming nitrites, is upheld by many authors and by us personally after examining a large number of strains and is no longer questioned.

"(3) The ability or inability of different strains of plague bacilli to ferment glycerol and form nitrites is very marked and therefore may be suggested as a basis for dividing plague bacilli into variants.

" (4) The classifications and nomenclature of the variants suggested until now have not been complete, as they have either provided for only two variants and not three, or have attempted to assign the emergence of these variants to geographical and historical factors, e.g. to successively arising pandemics.

" (5) The reason for the emergence of variants of plague bacilli must be sought in physiological peculiarities of the rodents which are the principal vectors in nature of the plague bacillus and its natural habitat.

" (6) We propose that the variants of plague bacilli be called after the genera of rodents from which they were first isolated and in which they are in some places found to this day: (a) not fermenting glycerol but forming nitrites, the rat variant (*Bacterium pestis* var. *ratti*); (b) fermenting glycerol and forming nitrites, the marmot variant (*B. pestis* var. *marmotae*); (c) fermenting glycerol but not forming nitrites, the suslik variant (*B. pestis* var. *citelli*).

" (7) The study of variants of plague bacilli is of great practical and theoretical importance, because it clarifies the study of the focal occurrence of plague and the problem of eliminating the foci of infection, and makes it possible to prepare far more effective live anti-plague vaccine."

Domaradskii, I. V. **The Metabolism of Sulphur-Containing Amino Acids in Cultures of Plague Bacilli.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1957, v. 28, Nos. 5/6, 780–86, 2 figs. [Translated from Russian.]

" (1) The plague is not labelled by radioactive sulphur.

" (2) When it is grown in media containing radioactive sulphur in the form of cystine and methionine, labelled organisms can be successfully obtained.

" (3) Radioactive cystine and methionine enter into the composition of the proteins of the organism.

" (4) By means of paper chromatographic methods it was shown that the plague bacillus both utilizes cystine present in the medium and forms methionine from it.

" (5) The conversion of cystine into methionine is irreversible under the conditions of these experiments."

Larivière, M. & Abonnenc, E. Contribution à l'étude des puces de *Cricetomys gambianus* Waterhouse. [**Contribution to the Study of Fleas parasitic on** *Cricetomys gambianus*] *Bull. et Mém. École Nat. Méd. Pharm. de Dakar.* 1957, v. 5, 340–45, 3 figs.

The English summary appended to the paper is as follows:—

" Authors take a census of fleas of the Gambian Rats due to the

important place of these rodents among African Murides and the probable part played by them as plague virus carriers.

" Six species of fleas have been recognized up to now but there was found only 3 species at Dakar: *X. aequisetosa, Cetenocephalides felis felis, Echidnophaga gallinacea.*

" A morphological study allowing their specialisation is attached to this work."

NOTE

In the abstract of the paper by KARTMAN *et al.*, this *Bulletin*, 1958, v. 55, 763, the sentence " The principal reservoirs are believed to be prairie dogs, *Cynomys*, wood rats, *Neotoma*, and ground squirrels, *Citellus*." should read: " The principal reservoirs were believed by Eskey and Haas (1940) to be prairie dogs, *Cynomys*, wood rats, *Neotoma* and ground squirrels, *Citellus*, but the present authors remark that there has been in recent years a growing conviction among plague workers that rodents other than ground squirrels and the large conspicuous species may be more usual reservoirs of *P. pestis*."

CHOLERA

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

KOROBKOVA, E. I. **World Distribution of Cholera.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1957, v. 28, Nos. 5/6, 757–62. [Translated from Russian.]

GAN, K. H., ACHJA, E. M., SUKONO, ROEKMONO & WARSA, R. **First Cases of Paracholera El-Tor (Enteritis Choleriformis El Tor Van Loghem) in Java.** *Trop. & Geograph. Med.* Amsterdam. 1958, June, v. 10, No. 2, 113–16.

" The authors report on two cases of cholera El-Tor in Djakarta. These were the first cases observed in the Isle of Java: they may be considered to be autochthonous as the two patients never left Java.

" Clinically, cholera El-Tor behaves like true cholera, with a high death rate. Bacteriologically and serologically the Djakarta vibrios behaved like El-Tor vibrios.

" Epidemiologically these first two cases of cholera El-Tor in Java are of far-reaching importance as they prove that the disease is not restricted to the Isle of Celebes, but that at present it occurs also outside that island. As yet there is no indication as regards the origin of the El-Tor disease in Djakarta; importation from Celebes to the port of Tandjong Priok by means of ships is possible, at least as regards patient (I).

" The problem of the origin of the disease may be approached by extensive epidemiological investigations, comprising the tracing of suspected patients and the bacteriological examination of faecal matter of these patients, their families and their contacts, and of the (drinking) water from wells and ditches. At present this investigation is in full swing: the results will be published in due time."

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Biagi F., F., Navarrete, F. & Robledo, Efigenia. Observaciones sobre diagnóstico y frecuencia de la amibiasis y otras parasitosis en niños con diarrea, de la Ciudad de México. [**Diagnosis and Incidence of Amoebiasis and Other Parasitic Infections in Children with Diarrhoea in Mexico City**] *Bol. Méd. Hosp. Infantil.* Mexico. 1957, Dec. 1, v. 14, No. 6, 617–26.

The English summary appended to the paper is as follows:—

" We have studied 1,116 samples of stools in 385 children with diarrhea, most of them infants. Several variations for the methods of studying the stools were analyzed. *Entamoeba histolytica* was found in 18% of the cases of bloody diarrhea.

" When the stools can not be obtained in a suitable container, it is better to take the sample with a rectal spoon. When the direct examination is negative, it is recommended to do a culture in a media for protozoa. It is desirable to perform the parasitoscopic examination as soon as the suspicion of amoebiasis arises; it should be done immediately after obtaining the sample. Three successive examinations gave a security in the diagnosis of amoebiasis, in children with diarrhea. Specific treatment produces the rapid disappearance of *E. histolytica* in stools."

FAUST, E. C. **Parasitologic Surveys in Cali, Departamento del Valle, Colombia. I. Incidence and Morphologic Characteristics of Strains of *Entamoeba histolytica*.** *Amer. J. Trop. Med. & Hyg.* 1958, Jan., v. 7, No. 1, 4–15, 1 text fig. & 59 figs. on 2 pls. [21 refs.]

In this first instalment of a report on the results of a parasitological survey carried out by the author in Colombia, an account is given of the incidence of infection with and the morphological characters of *Entamoeba histolytica* in the population of the most backward district (Siloé) of Cali. For comparison, data were also obtained from other sources. A total of 1,178 faecal specimens were examined (in fresh or iodine preparations, directly or after zinc sulphate concentration, as well as in material preserved in MIF solution). Of these 301 contained *E. histolytica*, distributed as follows: 228 from 828 specimens (27·1%) representing 218 persons positive (33·5%) from Siloé; 58 from 146 specimens (40%) representing 58 persons (40·3%) from a mental hospital; 8 from 74 specimens (10·7%) representing 8 (11·1%) persons from the university hospital; 6 from 100 specimens (6·0%) representing 6 private patients (6·4%) and 1 from 30 persons (3·3%) obtained at autopsy. Since most of the stools examined were solid or semi-solid, the great majority of the parasites were represented by cysts. The material from Siloé contained both the large and small races of *E. histolytica* roughly in the ratio of 4 to 1 cases (199 and 48 respectively).

The morphology and differential diagnosis of cysts of the two races are described in some detail. The average diameter of the large race was 11·8 μ, its cysts contained 1–4 large sausage-shaped chromatoid bodies. their nuclear structure was clearly visible, and the glycogen vacuole typically formed a dense mass with irregular margins. Cysts of the small race measured from 6·8 to 7·7 μ, and contained small (" rice-grain ") chromatoids; their nuclei were delicate in appearance, while the glycogen vacuole tended to form a large mass, sometimes displacing the nuclei to the periphery. The appearance of the cysts of both races are illustrated by two plates of figures, and detailed measurements are given in tabular form.

The incidence of amoebic infection in Siloé showed a familial distribution, being significantly higher in some households than in others. It is stated in the main text that " no frank case of amebic dysentery was encountered " in the locality in question, but, in the concluding section, the presence of " a clinically mild infection " is suggested, and it is mentioned that " clinical and necropsy evidence indicates that deep and extensive invasion of the tissues may occur, resulting at times in death ".

Although the author recognizes the existence in *E. histolytica* of two " racial groups ", he does not accept the specific independence of the small race, and accordingly proposes that the name *E. hartmanni* " as a species name should be dropped ".

[For a recent comparative morphological study of the two races of *E. histolytica* see this *Bulletin*, 1957, v. 54, 1316.] *C. A. Hoare*

SARKISIAN, M. A. [**Observations on *Entamoeba hartmanni* (Prowazek, 1912)**] *Med. Parasit. & Parasitic Dis.* Moscow. 1957, v. 26, No. 5, 618–23. [In Russian.] English summary (7 lines).

This paper is devoted to a comparative study of the morphology and host-parasite relations of *Entamoeba hartmanni* [otherwise known as the small race of *E. histolytica*]. The material for this work was obtained from "pure" infections with this amoeba in 6 human patients (mixed infections were excluded), none of whom had any intestinal disorders in the past or present.

From the study of fresh and stained preparations it was found that morphologically the trophozoites of *E. hartmanni* were similar to those of *E. histolytica*, differing only in their small size (5–10 μ), while the pseudopodia, nuclear structure (including position of karyosome) were identical in both species. Their cysts differed mainly in size and in the number of chromatoid bodies. The latter were present in up to 94% of *E. hartmanni* cysts of all stages, where they appear as rods, granules or formless lumps, varying in number and arrangement.

Further observations concerned the constancy of the dimensions of *E. hartmanni*, which was studied in 5 persons for periods of up to one year. Cysts were measured and treated statistically in serial preparations of 100 specimens each taken from 2 cases. The results are given in 2 tables, showing that throughout the periods of observation the cysts invariably measured less than 10 μ in diameter, the range being 5·3–8·9 μ (mean *ca* 7 μ), with similar dimensions for the trophozoites. These measurements are compared with those from 2 cases of infection with *E. histolytica*, the cysts of which measured 9·8–15 μ (mean 11·4 μ).

The author successfully cultivated *E. hartmanni* and found that the cultural forms of this species and of *E. histolytica* were indistinguishable morphologically and in size: thus in 3 strains of *E. hartmanni* the amoebae measured from 6·2 to 26·5 μ (means 13·2–15·6 μ), while in 2 strains of *E. histolytica* the range was 8·8–22·9 μ (means 13–15 μ). However, the dimensions of the amoebae of both species may vary considerably in different subcultures of the same strain.

According to the author, there is no evidence that *E. hartmanni* is ever pathogenic. Thus, none of the patients described in the present paper showed any clinical symptoms throughout the period of observation, while among more than 1,400 patients suffering from intestinal disorders in endemic areas of amoebiasis in no case could their condition be attributed to the small amoeba. Likewise *E. hartmanni*, when inoculated into 30 kittens and 10 rabbits, failed to produce any pathological changes or clinical manifestations, whereas *E. histolytica* produced typical symptoms of amoebiasis in control animals of the same species. It is concluded that *E. hartmanni* is not pathogenic to man or animals.

[In reviewing the relevant literature, the author does not mention a number of recent papers bearing on the same subject.] *C. A. Hoare*

DE CARNERI, I. Studi sulla virulenza di *Entamoeba histolytica*. 1. Variazioni cicliche della virulenza di un ceppo di *Entamoeba histolytica* nell'infezione intestinale del ratto albino in seguito a passaggi seriali *in vitro* e nel fegato di *Cricetus auratus*. [**Studies on the Virulence of *Entamoeba histolytica*. 1. Cyclical Variations in the Virulence of a Strain of *E. histolytica* in the Intestinal Infection of Rats following Serial Passages *in vitro* and through Hamster Liver**] *Riv. di Parassit.* Rome. 1958, Jan., v. 19, No. 1, 7–20. [Numerous refs.] English summary.

In spite of numerous recent investigations on variation in the virulence of *Entamoeba histolytica*, it is still unknown whether this parasite is represented by distinct races, in which this characteristic is hereditarily fixed, or whether its virulence may fluctuate under the influence of external factors. After reviewing the literature on this question, the author describes his own observations and experiments, which throw further light on this problem.

The investigation was carried out with a strain isolated from a patient in Liverpool, where it was maintained for over a year in culture before a substrain was sent to the author. While in England, this strain retained its original high virulence for rats, but in Italy—where it was grown in the same medium (Pavlova's)—its virulence for rats gradually diminished in the course of 3 months, from a state when the amoebae invaded the caecal wall with the production of marked ulceration to a state when the amoebae failed to invade the tissues but were present in the caecal contents. The attenuated strain was then carried through 13 serial passages in hamsters' livers, with the result that its virulence for rats increased progressively, and was finally restored to its original level. After further cultivation, the virulence of this strain began to diminish until in about 50 days it again became non-invasive. Similarly, in a line of the same strain, which had become attenuated in the course of continuous cultivation during one year, the original virulence was fully restored after serial passages through 5 hamsters' livers.

In the light of these and previous observations, the author suggests that the conditions under which *E. histolytica* lives in the lumen of the human intestine might be comparable to those obtained *in vitro*, likewise resulting in loss of virulence by such a strain. It is argued that, under certain conditions, this attenuation might become irreversible, giving rise to non-pathogenic strains of this amoeba. *C. A. Hoare*

HARPER, Kathleen, LITTLE, M. D. & MARSHALL, A. L., Jr. **Comparison of Stool Collection Techniques in Amebiasis Investigations.** *Pub. Health Rep.* Wash. 1957, Nov., v. 72, No. 11, 1031–7.

The authors made a comparative study of various diagnostic methods for the detection and identification of *Entamoeba histolytica*, in order to establish a procedure suitable for epidemiological investigations and

requiring a minimum of laboratory work. For this purpose 110 stool specimens, obtained from inmates of an Indiana State mental institution, were collected in 3 portions each: (1) unpreserved, (2) preserved in polyvinyl alcohol [PVA] fixative and (3) in MIF fixative (merthiolate formalin + Lugol's iodine solution). The unpreserved faecal specimens were examined in saline and iodine mounts, as well as by zinc sulphate concentration, while faecal smears preserved in PVA were stained by the iron haematoxylin phosphotungstic acid method. Those preserved in MIF were usually examined directly, as well as after concentration by Blagg's technique (MIFC) [this *Bulletin*, 1955, v. 52, 700]. Lastly, a combination of these methods was used.

The results are shown in a table, from which it is seen that the most efficient single technique was the MIF concentration method which revealed 76·0% of all protozoa and 84·4% of *E. histolytica* infections; the second place was occupied by the PVA fixative combined with haematoxylin staining, by which 65·4% of all the protozoa and 65·6% of *E. histolytica* were detected; in the case of direct wet mounts of unpreserved faecal specimens the results were 46·6% and 31·2% respectively.

In assessing the efficiency of single and combined methods, it is pointed out that the MIF concentration is the best of the single methods, but a combination of MIF concentration and haematoxylin-stained PVA fixed smears is of the highest efficiency. An account is also given of the successful application of these techniques in a sanitary survey of a college, where cases of amoebiasis were reported.

The techniques and their evaluation are described in some detail in this paper, which should be consulted in the original by those seeking further information. *C. A. Hoare*

da Silva, J. R. & Torres, E. Amebíase hepática. Algumas considerações sôbre os diferentes tipos de agressão amebiana ao fígado. [**Observations on Different Types of Liver Involvement in Amoebiasis**] *Gaz. Méd. Portuguesa*. 1958, Jan.–Feb., v. 11, No. 1, 151–64, 9 figs. [42 refs.]

The English summary appended to the paper is as follows:—

"The authors discuss in the present paper the different types of liver involvement in amoebiases, giving some illustrative examples of them.

"It is admitted that, from the clinical standpoint, there is a precursor stage of the well developed amoebic abscess of the liver, which corresponds to the designation of acute amoebic hepatitis.

"A histologic study of the liver through puncture biopsy in 40 cases of chronic amoebiasis, 7 of which were in an acute phase of the disease, is presented. In this study, no specific changes, directly related to amoebiasis, could be demonstrated. The mild lesions observed were considered due to some non specific mechanism, probably related either to the absorption of bacterial products, through the damaged bowel, or to

some nutritional deficit coexistent with the parasitic infection or caused by it. The role of other morbid associations in the genesis of these lesions is also discussed.

"A histological picture of a true acute amoebic hepatitis could not be demonstrated, even in cases where some degree of hepatic enlargement and tenderness existed."

JUNIPER, K., Jr., STEELE, V. W. & CHESTER, C. L. **Rectal Biopsy in the Diagnosis of Amebic Colitis.** *Southern Med. J.* 1958, May, v. 51, No. 5, 545–53, 9 figs. [10 refs.]

For over a year pinch forceps biopsies of rectal ulcers have been done during sigmoidoscopy of patients suffering from diarrhoea in Little Rock, Arkansas. No enema or other washout was given before the examination. In 14 cases vegetative *Entamoeba histolytica* have been found in the fresh or the stained specimens so obtained, and in 4 other cases (children between 3 and 5 years), where actual biopsy was not done, mucoid material containing similar parasites was obtained sigmoidoscopically. Previous routine stool examinations had failed to establish the presence of the infection in some of these patients. Details of the technique and some illustrative case reports with photomicrographs are set out in the text. The patients all came from an insanitary rural area dependent on a dubious well for their water supply. Amoebiasis in that locality would seem to be unusually prevalent, and several cases of liver and 2 of skin amoebiasis have been seen by the authors.

Rectal biopsy is not advocated as a substitute for stool examination in the diagnosis of amoebic dysentery. If care is exercised in the proper collection of the biopsy material and its examination, this method yields a high percentage of positive diagnoses and it is a valuable supplementary to stool examination, when required. *A. R. D. Adams*

JIMI, K. [**Clinical Studies on Intestinal Amoebiasis**] *Igaku Kenkyu.* Fukuoka. 1958, Mar., v. 28, No. 3, 774–96, 2 figs. [97 refs.] [In Japanese.] English summary.

This long paper from Kyushu University, Japan, deals with the clinical and bacteriological aspects of 53 cases of intestinal amoebiasis. The original Japanese text contains numerous tables and figures. The following points are taken from the English summary:

79% of patients had never been away from Japan; their symptoms were mild. When intestinal ulceration was demonstrated, the incidence of amoebic cysts was found to be higher than in its absence. Ulceration was found whenever moderate or severe tenderness of the colon was present but in only 65% of patients when tenderness was mild or less intense. Ulceration was present in 76% of patients in whom the sigmoid colon was found to be hard and in 66% when it was less hard.

The most rapid clearing of ulcers and cysts followed the use of tetracycline. In descending order of effectiveness were carbarsone, Enterovioform and emetine.

In the bacteriological studies, 997 strains of *Escherichia* were isolated from aspirated rectal flora of the 53 patients. By the IMVIC classification these were 55·3% *Escherichia*, 7·6% *Klebsiella*, 3·6% intermediate and 33·5% undetermined. 234 (42·5%) of 551 *Escherichia* strains belonged to 25 0-serotype species. In the first 47 strains isolated there were 6 of 0–8, 5 of 0–9, 4 of 0–4, and 3 each of 0–5, 0–18, 0–19, 0–22, 0–23 and 0–25.

In 7 out of 9 patients treated with tetracycline *Escherichia* disappeared in 2 to 7 days: *Pseudomonas* and *Proteus* persisted. In 7 of 10 treated with carbarsone, *Escherichia* disappeared in the same period, but some persisted. In 15 of 17 treated with Enterovioform, there was no change in the flora, except for the transient appearance of 0–18 and 0–15 in 2 cases.

Emetine was ineffective in 9 cases and in 8 untreated control patients the intestinal bacterial flora remained unchanged.

H. J. O'D. Burke-Gaffney

Anderson, H. H., Wilmot, A. J., Freedman, L. & Anderson, Jeanette van D. **Acute African Amebiasis: Clinical-Laboratory Studies and Response to MA-307.** *Amer. J. Trop. Med. & Hyg.* 1958, Mar., v. 7, No. 2, 201–4, 1 chart.

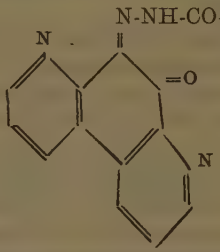
MA-307 is described as " N,N^1-dipiperonyl-5, 11-diamino pentadecane-diHCL ", and it has been shown experimentally to possess amoebicidal activity. An opportunity was taken for therapeutic trial of the compound on the Bantu patients suffering from severe and acute intestinal amoebiasis in Durban, S. Africa. These were all hospital patients who were passing haematophagous amoebae; they had sigmoidoscopically visible bowel lesions; and they were free from obvious complications, such as liver involvement. 11 such patients were treated with 600 mgm. of the compound by mouth daily for 10 days. No clear therapeutic benefit was produced in any of these patients, who were all then treated with emetine or other effective amoebicides.

Serological examinations of Bantu patients with amoebiasis showed that an increase in alpha-2-globulin and gamma globulin levels, and disturbance of zinc sulphate and thymol turbidities, were more usual than abnormal cephalin flocculation and other tests. *A. R. D. Adams*

Roy Chowdhury, A. K., Roy Chowdhury, Amiya K. & Nandi, R. **New Synthetic Compounds in the Treatment of Amoebiasis.** *J. Indian Med. Ass.* 1958, Apr. 16, v. 30, No. 8, 239–51.

This is a preliminary report on the amoebicidal action of two new compounds chemically unrelated to hitherto recognized amoebicidal drugs.

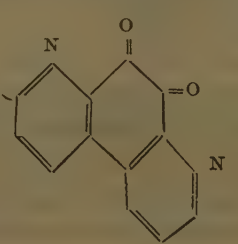
The first of these (11/925) is the semicarbazone of 5,6-quinone-4, 7-phenanthroline, of which the structural formula is as follows:—



This is a yellow and odourless, but bitter-tasting, substance only slightly soluble in water; it is put up in 100 mgm. tablets. Its amoebicidal titre *in vitro* is 1 in 8,000, and so is about that of Vioform, carbarsone or aureomycin. At a dosage of 100 mgm./kgm. it controls an experimental infection with *Entamoeba histolytica* in rats, and if sustained it eliminates it. The drug is absorbed from the intestine and excreted in active form in the bile and the urine. Amoebicidal levels of 1 in 40 are reached in the blood of the rat after oral doses of 500 mgm./kgm., and of 1 in 40 to 1 in 60 in the caecum after 100 mgm./kgm. It therefore seems that the drug should be effective against both intestinal and hepatic infections with the parasite. 11/925 is bacteriostatic against both Gram-negative and Gram-positive organisms. Its toxicity is low after single doses; sustained higher dosage causes renal lesions in animals.

For human therapeutic trial a dose of 100 to 200 mgm./kgm. was given orally thrice daily after meals for 7 to 10 days. 6 patients with acute and 9 with chronic amoebic dysentery were treated. Another 6 patients with hepatitis complicating an amoebic dysentery also were treated. The data relevant to these 21 cases are set out in a table. Briefly, clinical cure followed treatment in 12 instances; symptomatic relief in 3; and some benefit in 2. The remaining 4 gained no benefit, but these [in common with 14 others] suffered from nausea and vomiting due to the drug, and it is suggested that as a result they did not absorb it. From the table it is evident that *E. histolytica* was present in the stools of at least 5 of these patients after the treatment.

The second drug examined (11/925C) was 5,6-quinone-4,7-phenanthroline, with the following graphic formula:—



The amoebicidal titre of this compound *in vitro* is 1 in 16,000; *in vivo* in the rat the amoebicidal dose is 50–75 mgm./kgm. when given for 5 days by mouth. 100 mgm./kgm. could be given daily to rats for 21 days without the development of recognizable histopathological changes in any organs.

For human therapeutic trial 40 patients with amoebiasis (5 of them stool-negative but with suggestive histories) were given the drug in dosages ranging from 250 mgm./kgm. to 500 mgm./kgm. daily for 5 to 10 days. 7 of these patients suffered from acute amoebic dysentery [2 are recorded as passing cysts], 22 chronic, and another 11 suffered from a complicating hepatitis considered to be due to the amoebic infection. The relevant data are set out in another table. The authors consider that all 7 acute cases were cured both clinically and parasitologically by treatment with 11/925C; 16 of the chronic cases were clinically cured; one patient enjoyed symptomatic relief; 4 benefited from the treatment; and only a single patient gained no benefit. Toxic side effects were trivial.

Finally, 9 patients initially treated with 11/925—which had had to be stopped on account of intractable side effects—were subsequently treated with 11/925C. The diminution in toxic side effects with the second treatment was striking; 2 of these patients were not cured parasitologically; 5 were clinically cured and the other 4 benefited from the treatment. 11/925C, it is suggested, is an efficacious and non-toxic amoebicide. Hepatic manifestations improved with both drugs.

[In the abstracter's opinion inadequate numbers of stool examinations after treatment invalidate satisfactory conclusions as to the efficacy of either of these drugs. In only one case were 5 post-treatment specimens of stools examined; in the majority only a single specimen was obtained; and 2 specimens sufficed in most of the remainder.] *A. R. D. Adams*

Chatterjee, P. K., Mukherjee, S., Ghose, S., Datta, K. P. & Sircar, S.
Clinical Trial with Two New Synthetic Compounds in Amoebiasis.
J. Indian Med. Ass. 1958, Apr. 16, v. 30, No. 8, 251–4.

These 2 quinone phenanthroline drugs (*vide supra*) showed amoebicidal activity both *in vitro* and *in vivo*. 34 patients with symptoms of dysentery, all of them with intestinal protozoal infections (25 of them with *Entamoeba histolytica*), were treated with compound 11/925 given orally [precise dosages not clearly specified]. The treatment sometimes had to be reduced (in several cases) or stopped (in 2 cases) because of serious intolerance—chiefly in the form of nausea and vomiting. All those harbouring *E. histolytica* intestinal infections who endured the full course of treatment with this drug were symptom-free and stool-negative on its completion. All of 3 patients with hepatitis complicating their intestinal amoebiasis were relieved of the former by the treatment with 11/925.

Another 16 patients with *E. histolytica* (and other) intestinal infections

were likewise treated with the second compound 11/925C. The clinical response was equally good in that their diarrhoea rapidly ceased, but *E. histolytica* in one form or another persisted in the stools of about half these patients on the completion of treatment. One patient with hepatitis complicating intestinal amoebiasis gained no benefit from the treatment with 11/925C. 11/925C, therefore, though less toxic, proved a considerably less effective amoebicide than 11/925.

[No details of stool examinations are forthcoming other than the statement that " Stools were examined several times before the administration of the compounds and periodically during the course of treatment and afterwards ".] *A. R. D. Adams*

Stam, A. B. **The Relationship between** *Entamoeba invadens* **Rodhain and its Hosts.** [Thesis.] 51 pp., 4 figs. [Numerous refs.] 1958. Utrecht: Kemink en Zoon, Domplein 2.

This thesis for a doctorate in the University of Leiden is devoted mainly to the host-parasite relations of *Entamoeba invadens*. Since this reptilian parasite is closely related to *E. histolytica*, the author's findings are compared with the known facts about the human parasite. In the first chapter an account is given of the incidence of *E. invadens* in reptiles from some zoological gardens of Holland. Among the numerous species examined 5 proved to be infected. Of these, *Eunectes scytale* and *Crocodylus niloticus* were cyst-passers (carriers), *Constrictor constrictor* and *Caiman crocodilus* had mild intestinal lesions, while in *Heloderma suspectum* the infection was acute and fatal.

In the second chapter the author discusses the question regarding the relationship between the " minuta " or lumen form and the invasive form of *E. histolytica* in the light of his observations on *E. invadens*. He concludes that both are essential stages in the life cycle of the amoeba and may be transformed into one another under the influence of suitable environmental conditions.

The third chapter is devoted to a biometrical study of the cysts of *E. invadens* in cultures. He found that this amoeba produced two types of cysts, large and small, the size of which depends upon the conditions under which they are grown (medium, frequency of transfers, temperature, etc.).

It was thought that the size of cysts might be associated with strains of the amoebae differing in virulence, but from the account given in the fourth chapter, dealing with experimental infection of lizards with cultural cysts of *E. invadens*, it is evident that cysts of both sizes are capable of producing acute infection in these reptiles. However, the author believes that in *E. invadens* amoebae arising from the large cysts are more virulent than those produced by the small ones. Similarly, in *E. histolytica* it was found that the cysts of strains from Indonesia, where acute amoebiasis is prevalent, were larger than cysts of strains from Holland, where

clinical amoebiasis is a rare occurrence. In discussing the host-parasite relations in reptilian and human amoebiasis, the author draws attention to the existence of symptomless carriers in both diseases. He also suggests that the original hosts of *E. invadens* and *E. histolytica* are crocodiles and Asian monkeys respectively. *C. A. Hoare*

Rossi-Espagnet, A. & Piccardo, M. G. Osservazioni su alcune strutture morfologiche e morfofunzionali di *Giardia intestinalis* studiata al microscopico elettronico. [**Observations on the Morphology of** *Giardia intestinalis* **studied by Electron Microscopy**] *Riv. di Parassit.* Rome. 1957, Oct., v. 18, No. 4, 213–17, 8 figs. on 4 pls. [23 refs.] English summary (8 lines).

The minute structure of *Giardia intestinalis* was studied in material obtained from parasitized human beings by duodenal drainage. Smears of the fluid, which were made on coverslips covered with Formvar, were fixed in osmic vapour and examined by electron microscopy, in transparent and palladium-shadowed preparations.

In these preparations the flagellates presented the following appearance [illustrated by a number of electron micrographs]. The periphery of the cytoplasm is covered by a transparent lamellar zone which forms a kind of a membrane in which the body is encased. In shaded preparations the surface of the membrane appears to be irregular and rough. The zone of cytoplasm enclosed within the membrane shows a denser structure, in which the outlines of the sucking disk can be distinguished, as well as the two nuclei, that appear as oval areas of lower density. The flagella, which emerge at different levels, are of equal thickness throughout. They are transversely striated but are not provided with the fine lateral projections described for other flagellates. *C. A. Hoare*

RELAPSING FEVER AND OTHER SPIROCHAETOSES

Juillan, M. Survie de *Borrelia hispanica* (de Buen, 1926) dans le sang conservé à + 4°C. [**The Survival of** *Spirochaeta hispanica* **(de Buen, 1926) in Blood preserved at 4°C.**] *Arch. Inst. Pasteur d'Algérie.* 1958, Mar., v. 36, No. 1, 15–22, 4 graphs.

The author preserved the citrated blood of guineapigs containing spirochaetes (*S. hispanica*) at 4°C. and found that it retained its infectivity up to 18 days. The incubation period from inoculation to the first appearance of spirochaetes in the blood increased from 2 days, for blood preserved up to 7 days; to 4 days for blood preserved 14 days; and to 8 days for that preserved 8 days. Similar experiments with the blood of guineapigs that had recovered from the infection a month previously, gave uniformly

negative results. Three experiments with infected human blood gave similar results, the spirochaetes retaining their virulence up to 22 days with lengthening of the incubation period in inoculated animals the longer the blood had been kept. In all cases the resulting infection was typical, the only effect of keeping the spirochaetes under these conditions being the augmentation of the incubation period.

[See also this *Bulletin*, 1953, v. 50, 815.] *Edward Hindle*

WAGNER-JEVSEENKO, Olga. Fortpflanzung bei *Ornithodorus moubata* und genitale Übertragung von *Borrelia duttoni*. [**Reproduction in *Ornithodorus moubata* and Genital Transmission of *Spirochaeta duttoni***] *Acta Tropica*. Basle. 1958, v. 15, No. 2, 118–68, 17 figs. (2 coloured). [Numerous refs.]

The author, after an elaborate investigation of the reproductive system and reproduction in *Ornithodorus moubata*, including spermatogenesis and oögenesis, examined the possibility of genital transmission of *Spirochaeta duttoni* by this tick. It was found that the testes were almost as attractive to the spirochaetes as the central ganglion and after an infective meal accumulated in a thick layer in the testes. They were also found in the vesiculae seminales and the accessory gland. In spite of this, spirochaetes rarely reached the genital pore or entered the spermatophore. Copulation tests were made between infected males and uninfected females and in only 2 out of 107 experiments was transmission successful. It would seem, therefore, that transmission of infection from one tick to another by copulation is of little or no importance in the epidemiology of relapsing fever. *Edward Hindle*

LARIVIÈRE, M., ROUSSON, J. & ABONNENC, E. Les ectoparasites du *Cricetomys gambianus* Waterhouse de la ville de Dakar. [**External Parasites which infest *Cricetomys gambianus* Waterhouse, prevalent in Dakar**] *Bull. et Mém. École Nat. Méd. Pharm. de Dakar*. 1957, v. 5, 357–64, 3 graphs & 1 map. [10 refs.]

The English summary appended to the paper is as follows:—

"Authors note 20 species of Arthropoda, usual parasites of the rat of Gambia.

"1. 12 species of Acarians: 7 *Ixodidae*, 3 *Laelaptidae* and 2 *Trombiculidae*.

"2. 8 species of Insects: 1 *Hemimeridae*, 6 *Pulicidae* and 1 *Haematopinidae*.

"Eight of these ectoparasites exist at Dakar on the rats of Gambia.

"Authors point out the transmission system of recurrent fever, which is made almost inevitably by carrying out of the burrow by the *C. gambianus* of the Ornithodores larvae and nymphs."

YAWS AND OTHER TREPONEMATOSES

FURTADO, T. A. Manifestações tardias da framboesia. [**Late Manifestations of Yaws**] [Thesis]. 279 pp., 159 figs. [505 refs.] English summary. 1955. Belo Horizonte: Minas Gerais, Brazil.

This is a thorough study of the late or tertiary lesions of yaws. There is a final section 47 " Conclusions " in English. All the figures have Portuguese or English captions. There are 505 references. The lack of an index is partly compensated by a good table of contents. The book is based upon studies in the north-east of the state of Minas Gerais.

The author says that " Yaws is one of the major public health and social problems in Brazil ". [An anti-yaws campaign has—since the publication of the book—made good progress in Brazil.] Flies, as well as contact, are said to play a role as mechanical vectors. If a patient does not have an eruption of papillomata, and thus fails to develop some immunity, the initial lesion may persist and change into a late or tertiary ulcer. The prevalence of the skin lesions among 121 patients with late yaws was:

tuberous and nodular lesions	7·4%
ulcerative lesions	80·9%
keratodermia palmaris et plantaris	25·6%
gangosa	3·3%
juxta-articula nodules	—

Over 95% of tuberous, nodular and ulcerative lesions occurred in the lower limbs and were more frequent on the left. The late ulcerative lesions comprise 4 main types: limited ulcerative, serpiginous-ulcerative, cicatricial-ulcerative and tuberous-serpiginous-ulcerative. The differential diagnosis of late yaws ulceration from other ulcers, especially tropical ulcers, is based on the case history and epidemiological, clinical and laboratory data. Serpiginous yaws ulcers may resemble those of late syphilis but are more extensive and mutilating.

Keratodermia palmaris et plantaris was the only lesion in 10·7% of the author's patients. However, he includes keratodermia plantaris sulcata and keratodermia plantaris cribriforme in the group [which is not generally accepted].

Among 48 (39·6%) of the author's 121 patients, bones and joints were found involved as follows:

sabre tibia	29·1%
total and partial amputation of the toes	18·7%
ankylosis and contractures	64·5%
foot deformities	31·2%
deviation of the spine	25%
deviation of the hip	8·3%

The most frequent bone lesions found in radiographs were periostitis (76%), cortical thickening or endostosis (48%). Bone deformities were

found in 76% of patients, and joint involvement such as ankylosis, reduction of articular spaces, luxation, subluxation and deformities of various types, in 42%. Gangosa, juxta-articular nodules, goundu and dactylitis were rare. The author found no evidence of neural, cardio-vascular or ocular lesions.

The histopathological appearances of late skin and bone lesions were studied. Although there are no absolute criteria to differentiate them from late syphilitic lesions, the differences regarded as a whole do present separate pictures. *Treponema pertenue* was sought by silver impregnation or smears or sections in late lesions, but never found.

7 points may help to differentiate late yaws and syphilis; residence, history, co-existence of other late yaws lesions, more extensive skin and bone lesions, higher rate of reactivity to serological tests and absence of involvement of internal organs in yaws, and the histopathological picture.

Iodides and mercury had a definite therapeutic effect, but, of course, only antibotics are needed now and of these penicillin is the drug of choice and especially PAM or benzathine penicillin. Attention is called to the first use of penicillin in yaws reported in 1944 by DA CUNHA *et al.* [this *Bulletin*, 1945, v. 42, 1003].

Tables present data from the cases studied and 35 of the figures are of histopathological sections.

[The author is to be complimented on the extensive study he has made. The book merits study by other Portuguese readers. A paper on the late skin lesions, based upon this study, has since been published in English (*ibid.*, 1958, v. 55, 167).] *C. J. Hackett*

LEPROSY

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

MONTESTRUC, E. Les raisons de la ténacité de l'endémie lépreuse à la Martinique. [**Reasons for the Tenacity of the Leprosy endemic in Martinique**] *Bull. Soc. Path. Exot.* 1958, Mar.–Apr., v. 51, No. 2, 149–53.

The reasons for failure to control leprosy in Martinique are considered to be four-fold. (1) Delay in finding patients and bringing them under treatment. In the period 1951 to 1957 992 new cases of leprosy were found. and 386 of these patients were under 20 years of age. Of the total, 228 patients were lepromatous, 80 of whom were under 20. But these patients were not discovered soon enough, and in the meantime they had infected a number of children. (2) Failure to isolate open cases. The author considers that all open cases should be isolated, although it is true that

in the last 3 years, though this was not done, the number of open cases has diminished. (3) Control of children who have been in contact with lepromatous patients. Since 1954 some 388 such children have been examined and protected, but that is not one-third of the total. (4) Vaccination with BCG. It was found that 66% of children up to and including 15 years of age, who had been in contact with leprosy, were tuberculin- and lepromin-negative, while 23·4% were tuberculin-positive and lepromin-negative. The former should be vaccinated with BCG, but not the latter. However, it would be better if all these children were vaccinated with BCG at birth. *Ernest Muir*

Noel, R. & Marie-Suzanne (Soeur). Etude histologique des lésions provoquées par le bacille de Hansen et le *Mycobacterium marianum* sur la membrane chorio-allantoïdienne de l'embryon de poulet. [**Histological Study of Lesions provoked by** *Myco. leprae* **and the** *Myco. marianum* **on the Chorio-Allantoic Membrane of the Chick Embryo**] *Internat. J. Leprosy.* New Orleans. 1957, July–Sept., v. 25, No. 3, 243–6, 10 figs. on 2 pls.

The authors first describe the results obtained by inoculating lepra bacilli obtained from leprosy patients into the chorio-allantoic membrane of chick embryos. Microscopic examination showed a granuloma composed of histiocytes containing bacilli accompanied by thickening of the membrane. The subjacent mesenchyma became covered with small nodules centred round the blood vessels. In fact, without exaggeration one may say that the bacilli, having overcome the epithelial barrier, propagate themselves in the interior of the mesenchyma. The same appearances are claimed when in place of lepra bacilli *Myco. marianum* was used. The authors claim that after inoculation in chick embryo of acid-fast bacilli, whether they be rat leprosy bacilli, human leprosy bacilli or *Myco. marianum*, there appear on the surface of the membrane after 8 days small masses of whitish crystals about the size of a pin head, isolated or confluent, and covering the whole surface. The crystals are mixed with the bacilli. The nature of these crystals has not yet been fully ascertained, but is being investigated. *Ernest Muir*

Montestruc, E., Garcin, D., Berdonneau, R. & Benoist, J. Renseignements obtenus par la pratique simultanée de la tuberculino et de la lépromino-reaction chez les enfants contacts de lépreux apparemment indemnes de lèpre. [**Results obtained by simultaneously testing Tuberculin and Lepromin Reactions in Children in Contact with Leprosy who are apparently protected against Leprosy**] *Bull. Soc. Path. Exot.* 1958, Mar.–Apr.; v. 51, No. 2, 154–6.

132 children of up to 15 years of age were tested simultaneously for their reactions to tuberculin and lepromin. They had all been in contact with

leprous patients, but had so far shown no signs of leprosy. Simultaneous Mantoux and Mitsuda tests showed both reactions negative in 65%, Mantoux positive and Mitsuda negative in 23·4%, Mantoux negative and Mitsuda positive in 8·6%, and both positive in 3%. While the first group should be vaccinated with BCG, the second group should be vaccinated only if careful clinical and radioscopic examination fails to show any sign of tuberculous lesions. In the third group there has probably been inoculation with leprosy infection and the formation of a lesion so minute that it has not been possible to detect it, and such children should be kept under the strictest supervision. In 10 out of the 11 of this group it has been possible to confirm contact with lepromatous patients whose bacteriological tests were strongly positive. *Ernest Muir*

Rev. Brasileira Leprologia. S. Paulo. 1957, Oct.–Dec., v. 25, No. 4, 223–414, illustrated. [Numerous refs.] Simpósio sôbre "fundamentos para utilização do BCG na profilaxia da lepra". Sob os auspícios da Associação Brasileira de Leprologia (27 a 29 de Setembro de 1957), Rio de Janeiro. [**A Symposium on Fundamentals for the Use of BCG in the Prophylaxis of Leprosy. Under the Auspices of the Brazilian Association of Leprology**]

This symposium is an attempt to correlate and study the fundamental principles of the use and action of BCG in the prophylaxis of leprosy. The subject is divided into 4 sections, each of which was introduced by two or more speakers, discussed generally, and then replied to by the original speakers.

In the first theme a study is made of the interrelationship between tuberculosis and leprosy by F. E. Rabello (pp. 232–244). Tuberculosis often occurs during the course of leprosy and is a common cause of death. The two organisms may enter into competition with each other, but it is generally the tubercle bacillus that prevails. This is largely because of the greater susceptibility to tuberculosis of many of the vital organs, such as the lungs, kidneys, intestines and central nervous system. Leprosy patients react in a peculiar way to tuberculin. While the lepromin reaction is negative in almost all lepromatous patients, the tuberculin reaction is positive in a large proportion. Leprosy patients have crossed reactions of the tuberculin type and "prolonged" reactions of the Mitsuda type. These two types are compared, suspensions of tubercle bacilli being used as antigen.

A. Rotberg writes on the biological correlation between leprosy and tuberculosis (pp. 245–255). The delayed reaction of Mitsuda is compared with the reaction of Montenegro in leishmaniasis and of Kveim in sarcoidosis. The early reaction of Fernandez is almost universally admitted to be of an allergic nature. The lepromin reaction indicates

immunity and accompanying allergy; it depends on the unknown "N Factor". This factor is absent in about 20% of people, who are unable to produce a positive lepromin reaction. The problem is discussed of dissociating the negative lepromin reaction from the positive tuberculin reaction in lepromatous leprosy. It was possible to obtain, with BCG, conversion to positive tuberculin reaction in 35 of 51 healed lepromatous patients, but to positive lepromin reaction in only 13, and that only to the degree of 1 plus.

The second theme deals with the reciprocal behaviour of leprous infection in the presence of tuberculosis, and *vice versa*, from the epidemiological, clinical, immuno-allergic and serological points of view. L. M. Bechelli (pp. 267–295), writing on this subject, considers that there is some evidence of association between tuberculin and lepromin positivity, but that there are other elements which reduce the importance of this, and new experiments should be made, especially in rural areas and particularly in children. He considers that there are not enough data to prove that tuberculosis makes favourable the course of leprosy. He does not favour the hypothesis of Chaussinand [this *Bulletin*, 1949, v. 46, 1052] that the eradication of leprosy from Europe was chiefly determined by the spread of tuberculosis. J. N. Aun (pp. 297–302) on the other hand favours the use of BCG, especially in children during the first week of life, which will generally produce a positive lepromin reaction. In the discussion which followed there was considerable variance of opinion, some believing in the efficacy of BCG, and others considering that more evidence was required.

The third theme considers observations furnished by applied experiments. W. A. Hadler (pp. 323–330) lays down criteria for reading the lepromin reaction, based on the appearance and size of the nodule formed and on its histological appearance. He relates a number of experiments in which *Myco. leprae* suspensions were injected into laboratory animals and compares the results with those obtained by injections in man. R. D. Azulay (pp. 331–341) recounts a number of experiments affecting the lepromin test. In 9 cases of tuberculosis of the skin the early reading of the lepromin test was positive in all and the late reading in 87%; in 7 cases of Boeck's sarcoid the early reading was negative in all but one, and that one was the only tuberculin-positive. In 42 girls of 5 years and under, who were in a hospital in New York for early tuberculosis, 45% had a positive lepromin, an index much higher at that age than is found in areas highly endemic for leprosy. Further experiments showed that BCG induces a positive lepromin when given by mouth, and the percentage of positivity increases according to the dose administered.

The fourth theme deals with results collected of vaccination with BCG, and the means of evaluation. N. Souza Campos (pp. 349–367), after describing various experiments, is strongly of the opinion: that a frankly positive lepromin reaction denotes resistance to leprosy infection; that BCG can cause this positive state; that possibly injection of lepromin

may to a certain extent give the same result, but this requires confirmation; that it is a fact that injection with BCG can increase resistance to leprosy as it can to tuberculosis. Further studies are necessary to establish criteria for BCG vaccination, to verify the capacity of lepromin, to convert the lepromin reaction, to keep a check on the number of cases of leprosy occurring among people vaccinated with BCG and on the type of the disease.

This subject is also discussed by R. Quagliato (pp. 368–389).

Ernest Muir

Collier, W. A. **Lepromin Test and Allergic Paralysis.** *Trop. & Geograph. Med.* Amsterdam. 1958, June, v. 10, No. 2, 133–41. [Numerous refs.]

This paper does not describe any experiments done by the author; his object is to give a satisfactory explanation of the positive lepromin reaction in tuberculoid leprosy and in certain healthy people, and the negative lepromin reaction in lepromatous leprosy, although in the latter the circulating antibodies are stronger than in the tuberculoid form.

The explanation given is that in lepromatous leprosy the negative lepromin is due to allergic paralysis, the small quantity of antibodies that might have been formed being neutralized by the excess of antigen. Allergic paralysis is strictly specific in leprosy and caused by components of *Myco. leprae*. In lepromatous leprosy the presence of circulating antibodies proves that they are being produced by the cells, and it is wrong to assume strong resistance in tuberculoid leprosy where the circulating antibodies are less. People with a positive lepromin reaction have a latent infection with leprosy or with *Myco. tuberculosis* or some saprophytic mycobacterium. In lepromin-negative contact persons no " infection (existing or cured) with leprosy bacilli or other kinds of mycobacteria has taken place ". Rotberg's " N Factor " is not accepted, as " such a factor should inhibit *all* immunity processes in general ", while in lepromatous leprosy " the formation of antibodies is active, sometimes even very intensive, side by side with allergic paralysis ". *Ernest Muir*

Waaler, E. **The Isopathic Reaction in Leprosy.** *Internat. J. Leprosy.* New Orleans. 1957, July–Sept., v. 25, No. 3, 207–12, 6 figs. on 2 pls. [16 refs.]

The skin of patients suffering from psoriasis and other skin diseases has been found to react to various stimuli, traumata, etc., in a manner characteristic of the particular disease. This phenomenon is called the " isomorphic " reaction. The Kveim reaction in Boeck's disease is supposed to be of the same nature. A reaction of a similar type in leprosy was called " isopathic " by Sagher [see this *Bulletin*, 1955, v. 52, 273].

In 4 leprosy patients tested by the author the reactions produced locally by injecting intradermally 0·1 cc. of 1/100 Old Tuberculin were shown by histological examination to be as follows: in an active lepromatous case the reaction was lepromatous; in 2 residual maculoanaesthetic cases it was prelepromatous in one and noncharacteristic in the other; in a subsided lepromatous case it was noncharacteristic. The isopathic phenomenon in leprosy appears to be due to a peculiar change in the reactivity of the tissue, which may continue many years after leprosy has disappeared. It depends upon living cells and is not due to a humoral factor, or at least not to a heat-stable one. *Ernest Muir*

Enselme, J., Marie Suzanne (Soeur) & Tigaud, J. Mobilités électrophorétiques des pics γ augmentés dans le sérum des lépreux. [**Increased Electrophoretic Mobility of Gamma Globulin in the Serum of Leprosy Patients**] *C.R. Soc. Biol.* 1957, v. 151, Nos. 8/9, 1520–21.

The following is a translation of the authors' summary:—

The serum of leprosy patients always manifests an increase of γ globulins, which have the following mobilities: 2·5 (globulin γ^1) and –0·9 (globulin γ^2) 10^5 cm.^{2} V^{-1}S^{-1}. *H. J. O'D. Burke-Gaffney*

Michman, J. & Sagher, F. **Changes in the Anterior Nasal Spine and the Alveolar Process of the Maxillary Bone in Leprosy.** *Internat. J. Leprosy.* New Orleans. 1957, July–Sept., v. 25, No. 3, 217–22, 7 figs. on 2 pls.

Changes in the anterior nasal spine in leprosy were first described by Møller-Christensen and Faber [this *Bulletin*, 1952, v. 49, 872]. The present study was made in 44 patients under treatment at the leprosy hospital, Jerusalem, 30 of them being lepromatous, 10 indeterminate and 4 tuberculoid. Their ages were from 6 to 62 years, and the duration of the disease from 1 to 38 years. Examination was made of changes in the anterior nasal spine and the anterior maxillary process, by means of digital, dental and X-ray examination, and testing for anaesthesia. When the patients were divided into 3 groups according to the duration of the disease, it was found that in the first group with an average duration of 17·1 years, the nasal spine was lacking, there was resorption of the frontal maxillary alveolar process, and loss of the upper incisors. In these advanced cases there were proportionate changes in the bones of the nose, producing saddle nose, and bone resorption in hands or feet or both. In the other groups of shorter disease duration these signs were proportionately less. *Ernest Muir*

Doull, J. A., Rodriguez, J. N., Davison, A. R., Tolentino, J. G. & Fernandez, J. V. **Clinical Evaluation Studies in Lepromatous Leprosy. Second Series: Isoniazid and Diasone (Diamidin), Isoniazid and Dihydrostreptomycin, also a Pilot Study with Streptohydrazid.** *Internat. J. Leprosy.* New Orleans. 1957, July–Sept., v. 25, No. 3, 173–92.

This paper reports the second series [this *Bulletin*, 1955, v. 52, 1097] of an extensive experiment, arranged by the Leonard Wood Memorial in conjunction with local health authorities, to test the relative value of certain drugs in the treatment of leprosy. The tests were carried out in 2 institutions in the Philippines, where 187 and 202 patients completed the treatment, and at the Westfort Institution in South Africa, where 111 patients completed the treatment. The period of trial was 48 weeks. Patients were divided into 4 groups: Group A on Diasone 0·3 gm. orally every second day for 3 weeks, and then the same dose for the second 3 weeks, 0·6 gm. daily for the third 3 weeks and then 0·9 gm. daily; Group B on the same dose of Diasone plus isoniazid 10 mgm. per kgm. body weight orally; Group C on the above dose of isoniazid plus dihydrostreptomycin (DHSM) 1 gm. intramuscularly twice weekly; Group D on Streptohydrazid intramuscularly twice weekly. No tablets were given on Sundays.

All therapies were well tolerated. Clinical improvement was approximately the same in all groups. In all institutions the more advanced lepromatous patients and those who had had no previous treatment showed most improvement. Bacteriological improvement was more marked in the Philippine groups than in the S. African. A conclusion was arrived at " that in all probability much of the bacteriologic improvement observed in the second series was not attributable to any therapy but to unknown causes which were equally operative in all groups ". There was also some evidence " based on rather small numbers of patients that sulfone therapy continued over a period of two years may produce greater bacteriologic improvement than DHSM therapy for the same length of time ". *Ernest Muir*

Lewis, R. A., Kyi Kyi, K. & Edwards, R. **Cortisone in the Treatment of Reactional Conditions in Tuberculoid Leprosy.** *Internat. J. Leprosy.* New Orleans. 1957, July–Sept., v. 25, No. 3, 213–16.

A description is given of the results of combined treatment with cortisone and DDS in 7 out of 12 patients suffering from the tuberculoid type of leprosy, and in a state of reaction. Smears from all the patients were positive bacteriologically, varying from 1 to 3 plus. All the patients were under sulphone therapy at the time when the reaction began, the dose of DDS being from 25 to 100 mgm. daily. The daily dose of cortisone was between 100 and 12 mgm., being increased when the reaction was more

marked and diminished when the reaction became less. Although the oedema and erythema of the skin lesions subsided much more rapidly under DDS and cortisone than with potassium antimony tartrate, the time required before such therapy could be discontinued was longer than would have been expected had the latter drug been used. The authors consider that the length of time cortisone treatment was necessary may have been because DDS therapy was not suspended during the time of the reaction. The absence of neuritis during the course of these reactions treated with cortisone and DDS may be significant. "From the results which we have obtained one would be very chary about recommending DDS and cortisone for the treatment of reaction in tuberculoid leprosy, although the chief drawback to that treatment is the cost involved." *Ernest Muir*

Laviron, P. & Beytout, D. Le traitement des perforants et ulcères lépreux par les dihydroalcaloïdes de l'ergotoxine. [**The Treatment of Perforating Leprous Ulcers with the Dihydroalkaloids of Ergotoxine**] *Méd. Trop.* Marseilles. 1958, Mar.–Apr., v. 18, No. 2, 267–72.

The authors followed the work of B. B. Gokhale (*Dermatologica*, 1956, v. 113, 142) and injected 19 patients intra-arterially daily for 5 months with 0·3 mgm. of the 3 hydrogenated alkaloids of ergot of rye. They did not obtain the immediate and complete healing claimed by Gokhale, but of their 19 patients 9 healed, 3 showed amelioration, 6 remained stationary, and 1 became worse. The authors consider the treatment of use in healing ulcers, provided there is no underlying bone disease.
Ernest Muir

Cap, J. Dépistage, classification et traitement des lépreux au Congo belge (documents administratifs utilisés). Fonds Reine Élisabeth pour l'Assistance Médicale aux Indigènes (FOREAMI). Sect. Père Damien. [**Diagnosis of Leprosy Patients, and their Classification and Treatment in the Belgian Congo (with the use of official documents). Queen Elizabeth Fund for Medical Assistance to the Indigenous People (FOREAMI)**] *Bull. d'Information sur la Lèpre No. 4.* 1958, 53 pp., 1 fig.

This report is divided into 4 sections: the finding and classification of patients, ambulatory treatment, the relation between the out-patient centres and the leprosaria, treatment in the outdoor regional centres and in the leprosaria.

Patients are divided for administrative purposes into 4 categories: those with active lesions and under active treatment; those with only residual lesions but still continuing under treatment; those who do not need further

treatment as the disease is arrested but are still kept on the registers as patients; those considered to be entirely healed and no longer on the patients' register, though they still remain under regular medical control.

The greater part of this report is occupied with rules and regulations, forms and certificates, schemes of treatment and individual dossiers. [There is much that will be of value to those engaged in planning a campaign against leprosy in a primitive community.] *Ernest Muir*

Laviron, P., Beytout, D. & Jardin, C. Chimioprophylaxie de la lèpre chez l'enfant. [**Chemoprophylaxis of Leprosy in Children**] *Méd. Trop.* Marseilles. 1958, May–June, v. 18, No. 3, 491–2.

Prophylaxis of children of leprous parents by separation is difficult and unsatisfactory, especially in Africa. At the Marchoux Institute, Bamako, French West Africa, there are 1,500 leprosy patients living under village conditions, thus affording ideal conditions for spreading the disease to infants. For many years these children have been given antimalarial treatment, and during the last 2 years they have been given small doses of DDS [dapsone] in tablet form. A combined prophylactic is now given for malaria and leprosy. It has a pleasant taste and children will take it without difficulty. It consists of: tragacanth julep, 500 gm.; Tween 80, 0·25 gm.; dapsone, 2·75 gm.; Malocide [pyrimethamine], 1·40 gm. These are ground up and mixed. A teaspoonful corresponds to 23 to 34 mgm. of dapsone and 12 to 18 mgm. of Malocide. Children up to 1 year of age are given 1 teaspoonful weekly, those of 1 to 4 years are given 2 teaspoonfuls, and those over 4 years are given a soupspoonful.

For malaria prophylaxis the results are excellent. It is still too soon to say to what extent leprosy will be controlled, but so far out of 290 children there has been only one case in which lesions developed, and that only minor tuberculoid in a child of 7 years. Further trials are required with either a " cocktail " as above or dapsone in tablet form.

Ernest Muir

Aguirre de Gonzalez, Amelia. Plan de control de la lepra en el Paraguay. [**Plan for Control of Leprosy in Paraguay**] *Bol. Oficina Sanitaria Panamericana.* 1958, May, v. 44, No. 5, 411–19.

Paraguay has a territory of 406,752 sq. km.; and a population of 1,601,000, of whom 41·8% live in the capital. The diet of the people is deficient in vitamins A, B and C and in iron, and the children under school age suffer from hypoproteinaemia due to lack of milk. A preliminary survey of schools in the capital, Asunción, showed 2·16 per 1,000 children with leprosy, and a similar survey in the city of Luque showed 2·50 per 1,000.

The present plan for the control of leprosy resulted from a visit by Dr. Lauro de Souza Lima on behalf of the World Health Organization.

It is to abandon the tripartite scheme of leprosarium-preventorium-dispensary, which has formed the basis of organizations in other countries. The fundamental unit is the dispensary, and from this the work of diagnosis, treatment, observation, contact examination and prevention is organized. Isolation has not been successful. Prevention may include immunization with BCG.

The old leprosaria will become homes for invalids, and the preventoria homes for children. *Ernest Muir*

Olmos Castro, N. & Arcuri, P. B. **Sensitization of the Dog with Lepromin and BCG, and Evidence of Cross-Sensitization.** *Internat. J. Leprosy.* New Orleans. 1957, July–Sept., v. 25, No. 3, 231–7.

"It has been found that integral lepromin can sensitize dogs, confirming the observations of Wade (the Wade phenomenon), just as injections of BCG cause sensitization to that antigen. Using animals so sensitized it has been found, in both cases, that there exists a cross sensitization between BCG and lepromin."

Olmos Castro, N. & Arcuri, P. B. **Persistence of Sensitization and Cross-Sensitization to Lepromin and BCG in the Dog.** *Internat. J. Leprosy.* New Orleans. 1957, July–Sept., v. 25, No. 3, 238–42.

"A study has been made of the persistence of the phenomena of specific and nonspecific (cross) sensitization to lepromin and BCG in the dog. The time intervals between the sensitizing injection (or the second such injection when there had been two) and most of the test injections was around 9 to 10 months, but in two instances the interval was about 16 months.

"Three experiments were performed: (1) Of three dogs sensitized with BCG, two were tested with lepromin and the other with the homologous antigen (control). (2) Of four dogs sensitized with lepromin, two were tested with BCG and two with the homologous antigen (control). (3) Two dogs had been sensitized with both antigens, and were tested simultaneously with the two.

"From the results obtained it is concluded that the nonspecific (cross) sensitization to lepromin induced in the dog by BCG appears to be a phenomenon of transitory character which may disappear within nine months, whereas the nonspecific sensitization to BCG induced by lepromin is a more stable phenomenon, causing accelerated reactions after nine months and presumably longer. The specific sensitization induced by either lepromin or BCG is equally stable."

CHANG, Y. T. **Chemotherapy of Murine Leprosy. VII. The Effect of Cycloserine (Seromycin) on Mouse Leprosy.** *Internat. J. Leprosy.* New Orleans. 1957, July–Sept., v. 25, No. 3, 257–62, 6 figs. on pl. [13 refs.]

Because of its therapeutic activity in human tuberculosis, cycloserine (Seromycin) was tested by the author in mice infected with *Myco. lepraemurium*, comparing the effects with those of isoniazid, streptomycin and DDS. The mortality rates, body weights, and weights of omenta and pelvic fatty pads, were used as criteria. Cycloserine was found to be moderately effective in suppressing infected mouse leprosy, 0·2% in the food giving some effect, but larger doses giving about the same results as streptomycin, more than DDS, but not as much as isoniazid. The fact that in murine leprosy the bacilli are entirely intracellular, while in tuberculosis they are both intra- and extracellular, may account for the difference of action in the two infections. [For earlier parts of this series, see this *Bulletin*, 1953, v. 50, 1150, 1151; 1955, v. 52, 655.]

Ernest Muir

HELMINTHIASIS

In this section abstracts are arranged as far as possible in the following order:—TREMATODES (*schistosomes, other flukes*); CESTODES (*Diphyllobothrium, Taenia, Echinococcus, other cestodes*); NEMATODES (*Hookworms, Ascaris, Filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.*).

WEINSTEIN, P. P. **Some Projected Uses for the Axenic Cultivation of Helminths.** *Amer. J. Trop. Med. & Hyg.* 1958, Jan., v. 7, No. 1, 1–3.

The use of bacteria-free culture methods for the study of helminths will, when perfected, lead to new approaches in physiology, metabolism immunity, chemotherapy, host-parasite relationship and in the comparative biology of helminths.

The investigation of hypersensitization and allergic responses, the possible elaboration of true toxins, the phenomenon of host specificity and its counterpart, natural resistance, will be much easier if more is known of the physiology of the parasite as an individual.

Helminths, being multicellular organisms of complex structure with precise growth patterns, offer morphological landmarks to measure the effects of antibody which are not available in unicellular organisms such as bacteria. The exact biochemical and biophysical needs of the parasite throughout its life cycle—if these can be investigated *in vitro*—will give

information on the host-parasite relationship. It is hoped in the future that satisfactory methods will be devised.

[This address is a general review of the field and does not lend itself readily to abstraction.] *W. E. Kershaw*

Vervoorn, J. D. **An Epidemic of *haematobium* Schistosomiasis.** *Trop. & Geograph. Med.* Amsterdam. 1958, Mar., v. 10, No. 1, 93–5.

"The author describes an epidemic of schistosomiasis caused by *Schistosoma haematobium* Bilharz 1852, in a group of Europeans [in Ghana] who had been swimming in the same river for two to three years. The epidemic developed after an area of virgin jungle had been opened up; it was perhaps also due to a decrease in the speed of the current in the river.

"Very favourable results were obtained with a course of Stibophen."

Larivière, M. & Charnier, M. Contribution à l'étude des bilharzioses au Sénégal. Recherche des mollusques sur la presqu'île du cap vert. [**Contribution to the Study of Bilharziasis in Senegal. Search for Snails which inhabit the Cape Verde Peninsula**] *Bull. et Mém. Ecole Nat. Méd. Pharm. de Dakar.* 1957, v. 5, 336–9.

The English summary appended to the paper is as follows:—

"Authors relate results of series of investigations made during the dry season and tending to a study of fresh water malacological fauna of the immediate surroundings of Dakar.

"Different investigated water places (pools, cultivation trenches, etc.), showed existence in Cap Vert Peninsula of: *Anisus natalensis*, *Bulinus* (*Bulinus*) *forskalii*, *Gyraulus*, sp., *Segmentina* sp. and of very numerous *Lymnaea natalensis*.

"No *Bulinus* (*Bulinus*) *forskalii* placed under observation into laboratory had emitted furcocercaires."

Blair, D. M. **Lucanthone Hydrochloride. A Review.** *Bull. World Health Organization.* Geneva. 1958, v. 18, Nos. 5/6, 989–1010. [57 refs.]

"This review of the published work on the treatment of bilharziasis with lucanthone hydrochloride draws attention to the inconclusive nature of many of the trials carried out so far: either the dosage was inadequate or the patients were not followed up for a sufficient length of time. The author stresses the importance of obtaining a high concentration of lucanthone in the body fluids. He suggests that better results might be

obtained if the total dose were given in two days or even as a single, massive dose. This method might also reduce the side effects, which do not appear, as a rule, until the second or third day."

PARAENSE, W. L. **The Genera "Australorbis", "Tropicorbis", "Biomphalaria", "Platytaphius" and "Taphius" (Pulmonata, Planorbidae).** Reprinted from *Rev. Brasileira Biologia.* 1958, Apr., v. 18, No. 1, 65–80, 7 figs. [Numerous refs.]

"The anatomy of the type species of the planorbid genera *Australorbis*, *Tropicorbis*, *Biomphalaria*, *Platytaphius* and *Taphius* does not lend any support to their separation. Thus, all those genera must be considered as synonymous. Their union under the oldest generic name *Taphius* is not only dictated by the Rules of Nomenclature, but also necessitated by scientific progress, corresponding to a highly desirable simplification of an artificially confused subject.

"In order to explain the common existence of the genus *Taphius* in South America and Africa it is suggested, as a working hypothesis, its having been introduced in the latter Continent from the former one. Such belief is supported by paleontologic and neontologic evidence, among which the occurrence of the genus in the Paleocene of Brazil, and the existence of at least one species (*Taphius pfeifferi*, syn. *Biomphalaria pfeifferi*, *Australorbis centimetralis*) common to both Continents, may be mentioned."

PARAENSE, W. L. & DESLANDES, N. **Observations on "Taphius havanensis" (Pulmonata, Planorbidae).** Reprinted from *Rev. Brasileira Biologia.* 1958, Apr., v. 18, No. 1, 87–91, 4 figs.

"The morphological characters of *Planorbis havanensis* Pfeiffer, 1839, collected in its type locality (Havana, Cuba), show that it is identical with the Mexican species *P. maya* Morelet, 1849 and *P. liebmanni* Dunker, 1856, of which it becomes the senior synonym.

"From the generic standpoint, *P. havanensis* must be placed under *Taphius*; thus, its correct denomination is *Taphius havanensis* (Pfeiffer, 1839)."

ROWAN, W. B. **Mass Cultivation of *Australorbis glabratus*, Intermediate Host of *Schistosoma mansoni* in Puerto Rico.** [Research Notes.] *J. Parasitology.* 1958, Apr., v. 44, No. 2, 247.

A technique is described for the mass production of young snails for experimental work where space for aquarium tanks is limited.

6 tanks are used, each of 10 gallons capacity. One tank contains a number of adult snails which serve as egg-producers for the colony, the

others are fitted with a hammock of fine-mesh nylon net which extends into the water to a depth of about 4 inches. Egg-masses from the stock tank are placed in the hammock and the young snails are thus confined in the upper layer of water. The water in the tank is changed every 11–12 days and the young snails are provided with food in the hammock. As many as 800 snails can be raised to about 5 weeks old in each unit.

C. A. Wright

Prata, A. Biópsia retal na esquistossomose mansoni. Bases e aplicações no diagnóstico e tratamento. [**Rectal Biopsy in** *Schistosoma mansoni* **Infection**] 197 pp., 14 text figs. (13 coloured) & 18 figs. on folding pl. [Numerous refs.] English summary. 1957. Rio de Janeiro: Serviço Nacional de Educação Sanitária.

This study was undertaken at the Naval Hospital and the Gonçalo Moniz Foundation in Salvador, Brazil. The monograph is divided into two parts: the first deals with the development of *S. mansoni* eggs and the different types of them seen in the tissues of the definitive hosts; the second discusses results obtained with the use of rectal biopsy before and after treatment. Each part is preceded by a review of the literature.

In the first chapter, the various schistosomal elements—eggs, shells and parasitic nodules—are classified and the morphology of the various forms and stages is described and illustrated. The second chapter records experimental studies on the development and survival of *S. mansoni* ova, made in 134 mice, and this is followed by observations on the development of the eggs after treatment of patients with anthiomaline. There is then a chapter dealing with the identification of schistosomal elements in stained preparations, and this is illustrated by several coloured photomicrographs of histological sections. This part of the monograph ends with a chapter on the localization and elimination of schistosome eggs.

The second part opens with an account of the work on rectal biopsy and a review of the literature. There then follows chapter VI, the longest in the monograph and containing more than 50 pages, which deals with the methods used, and the means of recording results, on 2,346 biopsies carried out on 1,627 persons, mostly aged 16 to 20 years. These subjects were divided as follows: (a) naval recruits, (b) students of the Marine Apprentices School at Bahia, (c) naval and military personnel and their families, (d) patients at the Naval Hospital.

The methods of biopsy are fully described and the criteria for interpretation listed. The results are set out at great length in several tables and show the various schistosomal elements found before and after treatment, the results in relapsing and non-relapsing cases, and the comparative findings with rectal biopsy, faeces examination and the intradermal reaction. Chapter VII gives the results of histological examination of the fragments obtained by biopsy and ends with general conclusions.

Several points of special interest emerge from this study. Removal of a fragment of intestine containing schistosomal elements makes it possible to estimate the time at which they were laid, and this can be done accurately if the eggs are viable. If the eggs die after formation of miracidia this is evidence that they have been laid for at least 18 days. For the exact interpretation of a rectal biopsy the eggs must be identified accurately. Histologically the immature eggs are usually basophilic, intravascular and without evident tissue reaction; mature eggs are acidophilic, apparently extravascular and often surrounded by tissue reaction. It is important to determine the viability of eggs, especially after treatment.

Rectal biopsy is simple and requires little training, and no special preparations or after-care are required. Three fragments should be removed, one from each of the valves of Houston. An inspection of the rectal mucosa should be made. The fragments, after crushing between slides, should be examined by transillumination: histological examination is useful, but not so efficient. Before treatment 77% of viable eggs and 98% of non-viable eggs are found in positive biopsies.

A positive biopsy showing viable eggs indicates recent laying, *i.e.*, less than 18 days. Dead eggs, granulomas or shells suggest an active infection requiring confirmation. The presence of non-viable elements only suggests an extinct infection. Negative biopsy does not exclude schistosomiasis. It is claimed that rectal biopsy will yield more reliable results and more positive findings than will examination of faeces. 18 days after treatment, reappearance of viable eggs indicates relapse.

Multiple (3-fragment) biopsy in mild or asymptomatic cases in young adults in endemic zones will reveal some 80% of infections, compared with 52% for faecal examination and 82% for skin testing. Skin testing has, however, no value in the diagnosis of parasitic activity. In hepato-splenic schistosomiasis rectal biopsy demonstrates only 32%, while faecal examination is positive in 77%.

The best period in which to carry out rectal biopsy in follow-up of cure is 4 months after the end of treatment. The important point in assessing efficacy of treatment is the finding of viable eggs. Although 10 faeces examinations will disclose twice as many relapses as will one rectal biopsy, the latter will nevertheless disclose 12·6% of positive examinations which have been negative by faecal examination.

Rectal biopsy is not as suitable for epidemiological surveys as is the intradermal reaction: but if mass treatment is contemplated, rectal biopsy should be performed for the following reasons: (1) specific treatment should not be undertaken in patients diagnosed by the intradermal test, (2) treatment based on faeces examination will leave many patients untreated, (3) rectal biopsy is more practical than repeated faeces examinations. In determining cure, biopsy should be done after several negative faeces examinations.

This admirable study is full of information. Those who do not read

Portuguese will nevertheless profit from a study of the many tables and illustrations, the 4-page English summary and the bibliography of some 250 titles. *H. J. O'D. Burke-Gaffney*

Rodríguez-Molina, R. **Schistosomiasis Mansoni. Clinical patterns.** *Bol. Asoc. Med. de Puerto Rico.* 1958, Mar., v. 50, No. 3, 83–9. [13 refs.]

Attention is being focussed increasingly on this disease in view of the steady importation of patients harbouring it from Puerto Rico into the U.S.A. The author classifies its manifestations into 3 categories:— asymptomatic, gastro-intestinal, and visceral. In the first of these, living and dead eggs are passed in the stools. In the second, diarrhoea and abdominal pain dominate the clinical picture. In the third, the least common type, chronic invalidism results from permanent and irreversible visceral damage, and, in particular, cirrhosis of the liver with its associated late and grave sequelae. Acute schistosomiasis, and schistosomal pulmonary hypertension, are rarely seen by the authors.

A. R. D. Adams

Rodríguez, H. F. & Rivera, E. **Pulmonary Schistosomiasis.** *New England J. of Med.* 1958, June 12, v. 258, No. 24, 1196–9, 6 figs.

Two cases of pulmonary schistosomiasis with widely different clinical manifestations are presented. In 1, a case of cardiopulmonary bilharziasis, embolization of the pulmonary arterioles by the ova caused pulmonary hypertension and death from acute cor pulmonale. The other patient, who had severe hemoptysis apparently provoked by erosion of a pulmonary vessel by *Schistosoma mansoni* granuloma, was successfully treated by surgical removal of the affected lobe.

It is important that pulmonary schistosomiasis be strongly considered in endemic areas when patients presenting pulmonary or cardiopulmonary symptoms are seen, especially if hepatosplenomegaly is encountered.

Kloetzel, K. Considerações sôbre o emprêgo do miracil D no tratamento da esquistossomóse mansônica. [**Miracil D in the Treatment of *Schistosoma mansoni* Infections**] *Rev. Brasileira Med.* Rio de Janeiro. 1958, Feb., v. 15, No. 2, 87–90. [20 refs.]

The English summary appended to the paper is as follows:—

"Based upon his experience in the treatment of 61 cases of schistosomiasis mansoni with Miracil D, the author feels that this drug should find a wider use. Most of the patients were clinically improved, an apparent parasitologic cure being obtained in 72·1%. While intolerance towards the drug was found to be frequent and in some cases severe, the author feels that this will not prevent its acceptance in mass treatment."

Díaz-Rivera, R. S., Ramos-Morales, F., Sotomayor, Z. R. & Santiago, Sylvia. **The Treatment of Schistosomiasis.** *Arch. Intern. Med.* 1958, June, v. 101, No. 6, 1151–8. [59 refs.]

A general review and discussion.

Biagi F., F., Soto, R., Dorantes, S., Castrejón, Olga & Portilla, J. Dos casos de fasciolosis en su período inicial, como problema de diagnóstico. [**Two Cases of *Fasciola hepatica* Infection in their Early Stages**] *Bol. Méd. Hosp. Infantil.* Mexico. 1957, Oct. 1, v. 14, No. 5, 533–44. [31 refs.] English summary (8 lines).

Guttowa, Alicja. O epidemiologii, stanie badań i walce z difylobotriozą w Związku Radzieckim. [**On Epidemiology, Research and Eradication of Diphyllobothriasis in the Soviet Union**] *Wiadomości Parazytologiczne.* Warsaw. 1958, v. 4, No. 3, 219–27. English summary.

Doby, J. M., Doby-Dubois, M. & Deblock, S. Fréquence de la téniase par *Taenia saginata* chez 3,000 enfants de la région de Yaoundé (Cameroun) détectée par la méthode de Graham. [**Incidence of Taeniasis due to *Taenia saginata* in 3,000 Children of the Yaoundé Region (Cameroons) detected by the Graham Method**] *Bull. Soc. Path. Exot.* 1957, Nov.–Dec., v. 50, No. 6, 929–36, 1 fig. on pl. [22 refs.]

The authors refer to literature on the deposition of eggs by segments of *Taenia saginata* from their detached ends either into the intestine or during their movements through the spincter ani, compression by which may cause their accumulation on the anal margin. Podyapolskaya [this *Bulletin*, 1943, v. 40, 474] diagnosed infection of 96·4% of 638 persons by examining scrapings from the anal margin, the same author [*ibid.*, 1944, v. 41, 301] diagnosed 76% of 250 persons by anal scrapings, but only 57% by faecal examination. Mazzotti [*ibid.*, 1945, v. 42, 398] did 108 examinations of 10 persons by the Graham tape method and obtained positive results 92 times (85%), while faecal examinations done by a concentration method gave only 73% of positives. The present authors, doing a single examination by the Graham method on each of 3,000 children, found only 18 of the children infected (0·6%), though the eggs on the swabs were often very numerous, as a photograph shows. This is a particularly low incidence, when one considers that other authors quoted have found incidences between 10% and 50%. These relatively high incidences occur, however, in countries in which cattle are reared and cattle show a high incidence (between 50% and 80% in various countries) of infection with *T. saginata.*

The authors discuss the influence of race, age and sex on the infection. Their observations were too few to allow of general conclusions about age, but they think that the influence of race is masked by food habits. Gitlin *et al.* [*ibid.*, 1949, v. 46, 751] examined 1,427 Indians, Africans and half-breeds and found an incidence of 1·3% but no infections in the Indians, whose religion forbade them to eat beef. The present authors found no infections in 1,280 African children under 3 years old (no white children under 3 years were examined); but in 1,720 children over 3 years old the incidence varied between 0·27% and 4·75% among whites, Bantus, Bamilékés and Haussas. The Bantus were less heavily infected (0·27% of 1,107 children). They are mostly Christians and not forbidden by religion to eat pork; they can raise only pigs, sheep and poultry in the equatorial forest regions in which they live and cannot afford the zebu meat imported from the Northern Cameroons. The Bamilékés can afford the beef and the incidence in them is higher (1·15% of 173 examined). The rich Moslem Haussas eat beef killed in slaughter houses without sanitary control, and they showed the highest incidence (4·75% of 126 examined). The whites eat as much beef as the Haussas, but much of it is imported from France and their Cameroons beef is handled by European butchers who inspect it, and the incidence among them was 2·23% of 314 examined.

Opinions on the influence of sex on incidence of taeniasis are contradictory; the only special point noted by the authors was that the incidence in white boys was about twice that in white girls. *G. Lapage*

Sandars, Dorothea F. *Taenia solium*, **the Pork Tapeworm, in Australia.** *Med. J. Australia.* 1958, May 3, v. 1, No. 18, 607–8. [10 refs.]

"A case of infestation with *Taenia solium* from a Sicilian migrant is recorded. Treatment by starvation, purging and the administration of 'Atabrine Hydrochloride' was successful in removing the worm. There are seven previous records of *T. solium* in man and two in pigs in Australia. The danger of *T. solium* infestations is discussed, and the desirability of attempting to keep Australia free from this parasite is stressed. Since it is more dangerous than the endemic *T. saginata*, it is therefore suggested that 'infestation with *Taenia solium*' should be added to the list of notifiable diseases."

Ginsberg, A. **Helminthic Zoonoses in Meat Inspection.** *Bull. Epizootic Dis. of Africa.* 1958, June, v. 6, No. 2, 141–9. [17 refs.]

"Some meat-borne helminthic zoonoses which may be encountered during routine meat inspection in Kenya are discussed.

"Hydatidosis in sheep and goats has a high incidence but the number of human cases is comparatively small and it is suggested that wild

carnivora and not the domestic dog are the main carriers of *T. echinococcus*. The problem is primarily of an economic nature as a very high percentage of the viscera of sheep and goats are condemned.

"Cysticercosis in cattle is a serious problem for both the livestock producer and the meat industry. Present lines of research encourage the hope of eradication of this disease. Intra-uterine infection is confirmed and cysticercosis in 2–14-day-old calves is recorded.

"Cysticercosis in pigs is still negligible but a slight increase has been noted recently. With the constant growth of the industry and increased consumption of pork and pork products more stringent inspection methods are required to retain the *status quo*.

"Trichinosis, although not yet confirmed in Kenya, should not be overlooked as the rapidly expanding African pig production, the importation of pork products from Europe and the influx of people, whose eating habits favour the disease, may all lead to outbreaks.

"Improved meat inspection which would result from more and better abattoirs throughout the country, health education and the systematic use of taeniacidal drugs would do much to reduce the overall incidence of helminthic zoonoses."

[See this *Bulletin*, 1954, v. 51, 813; 1957, v. 54, 718; 1958, v. 55, 669.]

PAOLETTI, G. L'anchilostomiasi come malattia da lavoro in agricoltura. [**Ankylostomiasis considered as an Occupational Disease in Agriculture**] *Igiene Moderna*. 1958, Jan.–Feb., v. 51, Nos. 1/2, 53–76. [28 refs.]

The English summary appended to the paper is as follows:—

"After a brief mention of the pathogenesis of Ancylostomiasis, the epidemiological data are discussed. Such data demonstrate that Ancylostomiasis, which once was particularly frequent in miners and kilnmen, has spread in the last years particularly among peasants, so that in some districts the 43 per cent of the subjects under the care of the INAM [Istituto Nazionale Assicurazioni Malattie] (Agriculture section) reacted positively to the tests for the detection of the infection.

"Ancylostomiasis prophylaxis and therapy are described, and a discussion is made on the legislative aspect of the insurance, which is already being extended to the Agriculture section."

NAGATY, H. F. **Report on a Survey of Ankylostomiasis and other Parasitic Infections in Syria.** Reprinted from *Bull. Clin. & Scient. Soc. Abbassiah Facul. of Med.* 1957, Oct., v. 8, No. 2, 83–112, 2 figs. & 1 map.

In a rapid survey of ankylostomiasis in Syria, most of those examined were schoolchildren. Cities, where the streets are paved and nearly

everyone wears shoes, were almost free from infection. In the rural areas the highest infection rates were found in the Deir Ez Zor Governorate, near the Iraq border and traversed by the Euphrates; and the Hama Governorate, traversed by the Assi river. Rates of 80% or more were common in Deir Ez Zor. Banana cultivation on irrigated land manured with night soil provided conditions particularly suitable for transmission. No infection was found in Damascus, Homs, Latakia, Deraa, Sueda and Aleppo Governorates. The species was *Ancylostoma duodenale*. Intensity of infection varied from 300 to 1,500 eggs per gm. of faeces, and serious illness sometimes resulted, *e.g.* one boy was seen whose red blood corpuscles numbered only 750,000 per cmm.

The most prevalent helminthic infection found generally was ascariasis in 46%. *Trichuris*, *Hymenolepis nana* and *Trichostrongylus* were fairly common. *Taenia saginata* was found in only 20 specimens. Out of 860 stools examined for protozoa, *Entamoeba histolytica* cysts were found in 30, *E. coli* cysts in 129, *Giardia* in 9, *Iodamoeba* in 61, *Endolimax* in 6 and *Chilomastix* in 1.

Recommendations include mass treatment, supplementing diet, mandatory wearing of footwear, improvement of sanitation, raising of social standards and health education.

The results are shown in detail in several tables and the locations surveyed are shown on a sketch map.

[For earlier surveys, see this *Bulletin*, 1932, v. 29, 755; 1934, v. 31, 373.] *B. B. Waddy*

Vouilloux, P. & Voelckel, J. Le tétrachloréthylène dans le traitement de l'ankylostomiase infantile. [**Tetrachlorethylene in the Treatment of Ankylostomiasis in Children**] *Bull. Soc. Path. Exot.* 1957, Sept.–Oct., v. 50, No. 5, 812–21.

The authors compare the use of tetrachlorethylene and oil of chenopodium for the treatment of ankylostomiasis, which may, they say, occur in infants and young children. The worms found were mostly *Necator americanus*. They treated, at Douala, Cameroons, 250 children, aged between a few months and 6½ years. The two drugs were given without selection according to the admission of the children to hospital. Oil of chenopodium was given mixed with syrup, the dose being 1 drop per kgm. body weight plus 2 to 5 drops, according to the general condition of the child. 1½ hours later a saline purge was given followed, if necessary, by one or several aqueous enemas. If the first dose was well tolerated, a second and third dose were given at 48-hour intervals. Especially unmanageable children were dosed through a polythene tube inserted through the nose into the stomach. Tetrachlorethylene was given in the same rhythm in doses of 3 to 6 drops per kgm. body weight, 4 to 5 drops per kgm. being usually given.

The large doses of chenopodium were well tolerated and tolerance of the doses of tetrachlorethylene was satisfactory. Some children had diarrhoea and fever, and intolerance was severe in 3 children given tetrachlorethylene and in 2 given chenopodium. About half the children had subacute, periodic diarrhoea, but these suffered not only from ankylostomiasis but also from malnutrition due to various causes. Doses of tetrachlorethylene calculated on the adult dose (6 to 7 drops per kgm. body weight) should not be given to children without consideration of their general condition.

Results of treatment were checked by (1) egg counts [Stoll technique] done the day before, and 24 hours after, the first dose; (2) egg counts done on the total faeces passed during the 24 hours before treatment and during the third day after treatment; (3) counts of adult worms eliminated during the 24 hours after each dose of either drug given. An earlier study had shown that almost all the worms eliminated were passed during this period. The authors, however, also say that massive elimination of the worms may be delayed; they noted that one infant passed, after 3 successive purges, 37, 7 and 75 worms.

It is not possible to give in a short space details of the results obtained and of the authors' statistical analysis of these. They conclude that tetrachlorethylene gives better results in the treatment of infants than chenopodium does. Comparing an infant infected with but tolerating the worms well with another suffering profoundly from the infection, the authors recommend that the former can be given, without risk, a high dose of 5 drops of tetrachlorethylene per kgm. for infants below 2 years old and 6 drops per kgm. above that age. For children suffering profoundly the dose should be 3 to 4 drops per kgm., but in these cases as complete an elimination of the worms as possible is desirable and the doses can be repeated. The authors did not find, as did Brumpt and Ho Thi Sang [this *Bulletin*, 1954, v. 51, 295], that anthelmintic treatment succeeded better in anaemic patients, but their results did not permit a conclusion on this point. The highest proportion of worms is, paradoxically, removed from the most heavily-infected patients; digestive troubles, especially diarrhoea, seem to hinder the removal of the worms; age also has an influence, perhaps indirectly through digestive troubles, and these occur more often in children under 2 to 3 years old. However, there was no notable difference in the effect of these factors on results obtained with tetrachlorethylene and chenopodium. *G. Lapage*

Grove, S. S. & Elsdon-Dew, R. **Internal Auto-Infection with Strongyloides stercoralis.** *South African J. Lab. & Clin. Med.* 1958, Mar., v. 4, No. 1, 55–63, 9 figs.

A middle-aged Hindu infected with *Strongyloides stercoralis* was admitted to hospital with symptoms and signs resembling pyloric stenosis

or high intestinal obstruction, but on leporotomy no abnormality was found of the stomach, duodenum or small intestine.

Death occurred from broncho-pneumonia and larvae were found in the liver, lung, in the mucosa of the jejunum, in the mesenteric lymph node, and a few in the colon. [These are identified as being filariform but this identification would seem to be difficult to the abstracter; their presence was thought to be due to internal auto-infection.]

The clinical condition was attributed to the infection with *S. stercoralis*. [See also this *Bulletin*, 1954, v. 51, 956.] *W. E. Kershaw*

Haley, A. J. **Host Specificity of the Rat Nematode,** *Nippostrongylus muris*. *Amer. J. Hyg.* 1958, May, v. 67, No. 3, 331–49, 2 figs. [56 refs.]

Doby, J. M. & Fourcade, R. L'ascaridiose et la trichocéphalose chez les enfants autochtones de la région de Yaoundé (Cameroun). Résultats récapitulatifs concernant le parasitisme intestinal par helminthes. [**Ascariasis and Trichuriasis in African Children in the Yaoundé Region (Cameroons). Recapitulating Results on Helminth Intestinal Parasitism**] *Bull. Soc. Path. Exot.* 1957, Nov.–Dec., v. 50, No. 6, 937–45, 2 graphs.

The authors used the Graham tape technique for the diagnosis of infections with *Ascaris* and *Trichuris*, but emphasize that this technique may fail to find eggs of these worms during periods when the eggs are not being passed out, so that results obtained give only minimum figures of incidence. The paper itself and the tables and graph that summarize the results must be consulted. Briefly the authors found that 50·4% of the children examined were infected with *Ascaris* and 20·69% with *Trichuris*, but the incidence varied considerably in the different areas and with the age of the children. *Ascaris* was found in children under 1 month old, but at 1 to 3 months the incidence was 20% and then increased up to the age of 3 years, remaining fairly constant until the age of 15 years, but varying during this period between 60 and 70%. *Trichuris* was not found before 3 months of age, but remained at about 4% from 3 months to 1 year, when it increased to about 30% in children aged 3 to 15 years.

The authors compare their results with those of Lamy and Lamy [this *Bulletin*, 1954, v. 51, 842], who found in Brazzaville in the French Congo a comparable incidence of *Ascaris* up to the age of 9, but a diminution of it after that age. Lamy and Lamy found an identical incidence of *Trichuris* up to the age of 1 year, but after that an increase of only 10·3%.

The incidence found by the present authors varied little according to sex. They conclude that, having regard to the limited validity of the

technique used and the particularly high incidence (72 to 91% according to the locality and 83 to 86% according to age) among children of school age, they can rightly say that the whole population aged 3 to 15 years is infected with intestinal parasites. Although they found only one infection with ankylostomiasis, other intestinal helminths can considerably affect the health of the people.

[For a study of enterobiasis in the same region, see this *Bulletin*, 1958, v. 55, 199.] *G. Lapage*

URABE, K. [**Difference of Resistance against Heating between *Ascaris* Eggs in Faeces and Uterus**] *Igaku Kenkyu.* Fukuoka. 1958, Mar., v. 28, No. 3, 630–51, 2 figs. & 17 charts. [10 refs.] [In Japanese.]

The English summary appended to the paper is as follows:—

"It is generally believed that fertilized ascaris eggs obtained from the end part of uterus have the same physiological characteristics as those discharged in the feces. Consequently, both kinds of eggs are usually used for various experiments assuming them to be alike. It is true that both kinds of eggs show no morphological difference except for color and develop to larvae similarly in ordinary conditions. But author's experiment shows that the resistance of eggs obtained from the uterus against heating at 50°C for 10–30 minutes is markedly weaker than that of eggs collected from the feces.

"That the weaker resistance of the uterus eggs is not due to the lack of fecal matter of the host is evident by the fact that the heat resistance of uterus eggs mixed artificially with the fecal matter is still weaker than that of the eggs in feces.

"This weaker resistance of the uterus eggs seems due to prematurity, because the eggs discharged in culture liquid of females are more resistant against the heating than the eggs in the uterus as well as in feces.

"The result of this experiment must be taken into consideration when ascaris eggs are used in various experiments."

ROELS-BROADHURST, Dorothy & DE MAEYER, E. M. Le phosphate de pipérazine comme moyen de traitement de l'ascaridiose en milieu coutumier. [**Piperazine in the Treatment of Ascariasis in an Indigenous Population**] *Ann. Soc. Belge de Méd. Trop.* 1957, Dec. 31, v. 37, No. 6, 925–31. [11 refs.]

DEMAEYER *et al.* [this *Bulletin*, 1956, v. 53, 356] found ascariasis in 75% of the adults of Kivu, Belgian Congo, as determined by examination of fresh stools without concentration methods. In this paper they record the results of treatment of children at Kivu with piperazine phosphate. A brief review of literature on piperazine compounds is given.

The stools of the children examined were preserved by the MIF method [*ibid.*, 1954, v. 51, 311].

Treatment was given away from the hospital. Each child received for 6 consecutive days a daily dose, in tablets, of piperazine phosphate, all the tablets to be taken at once and in the presence of the doctor. Children aged 3 to 5 years had 900 mgm. (3 tablets); those aged 5 to 8 years, 1,200 mgm. (4 tablets); those over 8 years, 1,500 mgm. (5 tablets). No purgatives were given and there were no side effects.

Of the 231 children aged 3 to 12 years examined, 164 (71%) showed *Ascaris* eggs in the stools, a percentage comparable to that found in the adults (75%); but the actual incidence was higher, because 32 of the 67 children who did not show *Ascaris* eggs before treatment expelled *Ascaris*, a fact which brought the actual incidence up to 196 children (85%). The authors think that the remaining 35 children were also infected.

Examination of younger children showed incidences increasing from 1 positive in 13 children aged 6–12 months; to 4 of 10 children aged 24 to 30 months; and 2 positives in 5 children aged 30 to 36 months.

Of the 196 children infected there were no eggs in the stools of 168 (86%) examined 10 days after treatment ended. The average number of *Ascaris* voided by these children was 8·12 and the highest number voided by one person was 36. The voided *Ascaris* showed no signs of maceration or digestion.

Discussing whether piperazine can reach a concentration sufficient to affect the migratory larvae of *Ascaris*, the authors think that it is not certain that it can, especially if the less soluble compounds are used. It can inhibit the egg production of the worm, but it may eliminate only the adult worms, leaving immature forms behind, from which eggs may later appear in the stools. Thus 32 children aged 7 to 12 years were treated and their stools were examined weekly for 5 weeks. Of these 3 (9%) showed eggs in the stools after treatment; 4 showed no eggs during the 5 weeks after treatment; but 2 were negative for 3 weeks and then eggs reappeared during the fourth and fifth weeks. These eggs must have come from residual immature worms, because there had not been time for the development to the egg-laying stage of worms derived from re-infection with eggs. *G. Lapage*

Goodwin, L. G. **A Method for recording the Effects of Anthelmintics on the Movements of** *Ascaris lumbricoides*. *Brit. J. Pharmacol. & Chemotherapy*. 1958, June, v. 13, No. 2, 197–201, 8 figs.

Adult *Ascaris* were obtained from pigs and inserted into fine tubes made from nylon stockings. They were suspended vertically in a bath of modified Tyrode at 37°C., the posterior end being held down by a small weight and the anterior end being attached to a lever writing on a slow smoked drum. Arching movements of the anterior part of the body

were observed and also small searching movements of the head. This technique was used to study the action of drugs introduced into the bath. Piperazine citrate, 1:250, slowly narcotized the worm so that its movements ceased in 6 hours; lower concentrations took longer, the time being inversely proportional to the logarithm of the concentration. If the worms were washed after narcotization by piperazine, they partially recovered their motility. Male worms were 10 times more sensitive than female ones. Hexylresorcinol was 100 times as active as piperazine; it first stimulated the worm and then irreversibly immobilized it. Thymol resembled hexylresorcinol but was weaker. Oil of chenopodium 10^{-4} immobilized the worm in a few minutes. Santonin 10^{-3} suppressed the searching movements of the head but did not interfere with the arching movements of the body. Tetrachlorethylene caused violent convulsive activity of the worm, ending in contracture. These observations indicate that piperazine is the safest drug for the removal of *Ascaris* from man without causing damage by obstruction or perforation of the intestine.

[This is an elegant technique and the original article should be studied carefully by all who are interested in ascariasis.] [See also this *Bulletin*, 1958, v. 55, 428.] *F. Hawking*

Oram, R. H. **Filariasis on the North Nyasa Lake Shore.** *Central African J. of Med.* 1958, Mar., v. 4, No. 3, 99–103, 1 map & 2 figs.

There are only two areas in Nyasaland where filariasis is endemic and of these that of the Lower Shire lies in the southernmost part, and the Songwe area at the northern end of Lake Nyasa on the borders of Tanganyika. The latter area is about 100 square miles and has a population about 15,000.

Two tribes inhabit this area: to the north are the Wanyachusa and to the south the Wankhonde. Leprosy is extremely common and about 4% are affected. Cirrhosis of the liver, often due to beer, is common also, and most of the population suffer from *Schistosoma haematobium*, *S. mansoni* and ankylostomiasis. In most cases microfilariae of *Wuchereria bancrofti* were found, though *Dipetalonema perstans* did occur.

All persons in the vicinity had night blood films taken between the hours of 10 p.m. and midnight. South of Koronga township no case of microfilaraemia has been observed. Out of a total of 200 blood films examined 16% were positive; 2% in females and 14% in males. Probably this is not a true sample, because the figure includes many in hospital and also many infants. Night bloods taken at a rural dispensary in the Songwe area showed 25% infected and 12·5 with symptoms of filariasis.

Of the later effects of the filariasis seen here the most common is hydrocele. Elephantiasis of the scrotum is associated with a similar

condition of the penis. Elephantiasis of the legs is very common, but the patients do not worry themselves about it; that of the arms and breast are occasionally seen. Elephantoid fever with lymphangitis is rare; epididymo-orchitis is occasional. The elephantiasis rate varied in three villages from 0·914 to 3·13. No cases were seen below the age of 20. *Philip Manson-Bahr*

Oates, J. K. **A Case of Filariasis with Chyluria.** *Brit. J. Venereal Dis.* 1958, June, v. 34, No. 2, 122–3, 2 figs.

A case in England in a patient from British Guiana, who had been resident in Britain for 18 months.

Borski, A. A. & Tipton, R. R. **Filariasis of Testis.** *U.S. Armed Forces Med. J.* 1958, May, v. 9, No. 5, 740–44, 2 figs.

"A case of an isolated lesion of the testis due to filariasis is presented. No other manifestations of the disease were present. This adds another cause of benign lesions of the testis; however, it should not deter us from stressing the fact that all testis lesions should be considered malignant until proved otherwise."

See also p. 1079, Floch & Fauran, Sensibilité aux insecticides chlorés des larves de *Culex fatigans* et d'*Anopheles aquasalis* en Guyane Française. [**Susceptibility of *Culex fatigans* and *Anopheles aquasalis* to Chlorinated Hydrocarbon Insecticides in French Guiana**]

See also p. 1176, Wharton, **Dieldrin Resistance in *Culex pipiens fatigans* in Malaya.**

Morgan, H. V. **Onchocerciasis in the Northern Sudan.** *J. Trop. Med. & Hyg.* 1958, June, v. 61, No. 6, 145–7. [12 refs.]

Simulium damnosum is known to have been present for over 100 years in the north of the Sudan, but hitherto *Onchocerca volvulus* infection has not been reported from this region. A survey has now revealed that onchocerciasis does occur, its highest incidence being found between the fourth and fifth cataracts of the Nile, about latitude 19°N. Clinical evidence of infection was found in 30 of 73 schoolboys examined, and in 35 of 70 local residents selected as possible cases. Of 23 skin snips taken 9 were positive for microfilariae. Infected specimens of *S. damnosum* were found. Corneal opacities were found in 24 boys and 23 adults, but no other ocular involvement attributable to onchocerciasis. Thickening and darkening of the skin were common.

This focus of onchocerciasis is 1,000 miles from the nearest recognized endemic area, in the Bahr el Ghazal Province [this *Bulletin*, 1948, v. 45, 531; 1953, v. 50, 543]. It is arid, and *S. damnosum* is found in any numbers only between October and March. *B. B. Waddy*

Nelson, G. S. **"Hanging Groin" and Hernia, Complications of Onchocerciasis.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, May, v. 52, No. 3, 272–5, 4 figs.

"Hanging groin" is a sac of atrophic skin containing sclerosed femoral or inguinal glands in a matrix of connective tissue and lymph exudate. It has been seen in all areas in Uganda which are heavily infected with onchocerciasis, and in the Kodera and Kaimosi foci in Kenya. All the persons affected have severe onchocerciasis of long standing. The skin over the sac is thin and atrophic, the scrotum is unaffected and there is no hydrocele. The condition is thus neither a hernia nor a manifestation of elephantiasis. *Wucheria bancrofti* infection has not been seen in the onchocerciasis areas mentioned.

Hanging groin does, however, predispose to hernia. Femoral hernia, often bilateral, is very common in men in these areas, but in the non-endemic areas it is as rare as it is in England. The hernial sac is nearly always adherent to a mass of sclerosed glands. Hernia is not ordinarily regarded as a specific complication of onchocerciasis though all forms of filariasis may predispose to it [this *Bulletin*, 1942, v. 39, 188].

In Kenya and Uganda, onchocerciasis nodules are most common around the pelvis, the anatomical region where microfilarial concentrations are highest. Itching and scratching are prominent in the early stages and septic dermatitis and scabies commonly follow, with resultant lymph gland enlargement. Atrophic changes in the skin result in a "tissue-paper" texture, with loss of elasticity [*ibid.*, 1956, v. 53, 90], the glands sag, and in extreme cases the bag of glands may reach the knee. It is understandable that in many cases this weight of tissue may result in a hernia.

Lipomas, commonly noted by Harris in onchocerciasis [*ibid.*, 1941, v. 38, 522] may become pedunculated, presumably in the same way as the inguinal glands.

In Rodhain's review of adenolymphoceles [*ibid.*, 1952, v. 49, 1064], he illustrated typical cases of hanging groin and called them "pseudo-lymphoceles". He considered them to be allergic reactions to microfilariae of *Onchocerca volvulus*.

Hanging groin and hernia have not previously been associated with onchocerciasis in British territories in Africa or in Central America. The author believes them to be more widespread than is generally realized and he shows the conditions in 4 photographs, for the benefit of others, particularly as they may be operated upon by surgeons who fail to recognize their relation to onchocerciasis. *H. J. O'D. Burke-Gaffney*

See also p. 1143, Doby & Fourcade, L'ascaridiose et la trichocéphalose chez les enfants autochtones de la région de Yaoundé (Cameroun). Résultats récapitulatifs concernant le parasitisme intestinal par helminthes. [**Ascariasis and Trichuriasis in African Children in the Yaoundé Region (Cameroons). Recapitulating Results on Helminth Intestinal Parasitism**]

Telfer, J. G., Davis, M. R. & Brancato, F. P. **Effects of Phthalofyne in the Treatment of Human *Trichuris trichiura* Infection.** *Amer. J. Trop. Med. & Hyg.* 1958, Jan., v. 7, No. 1, 66–9.

The pathogenicity of *Trichuris trichiura*, especially in infants, is recognized and Gajardo and Atias (*J. Amer. Med. Ass.*, 1956, v. 162, 432) have recently recorded the death of a heavily-infected child aged 5. The authors think that moderate or small numbers of this worm are not innocuous, even in adults, as has been believed. For trichuriasis of dogs Burch (*Vet. Med.*, 1954, v. 49, 291), Ehrenford *et al.* (*J. Pharmacol. & Exper. Therap.*, 1955, v. 114, 381) and Bunde (personal communication to the authors) have found that phthalofyne(3-methyl-1-pentyn-3-yl acid phthalate), available as Whipcide, is a safe and effective remedy, and Hoekenga [this *Bulletin*, 1956, v. 53, 1468] treated 36 adult Honduran mestizos with it and obtained 22% of cures. He also treated another 107 fasting patients, in whom he obtained an overall cure rate of about 50%; but about 9·5% of these 107 patients developed conjunctivitis and keratitis 12 hours after taking the drug, as did 7 other patients, 2 of whom developed moderate deafness. Chimpanzees are said to have developed similar symptoms, but dogs do not unless they are given doses much in excess of those required for cures. The present authors tried to develop a method of giving the drug that would be effective and non-toxic.

The drug was given by mouth or as an enema, or both, to 10 healthy adult male Filipinos aged 22–25, though each had an eosinophilia ranging from 6 to 13% and most had been treated for infection with other intestinal parasites. Reports on the 10 patients are given. Of 7 patients given 100–125 mgm. per kgm. either by mouth, alone or in combination with the same dose given by enema, 4 complained of nausea or vomiting or both and there was no significant effect on the worms. One patient given the highest dose of 175 mgm./kgm. had considerable nausea and apparently vomited all the stomach contents, and there was no effect on the worms. One given enemas containing 200 mgm./kgm. and 450 mgm./kgm. showed no side effects and there were no effects on the worms. The simultaneous administration of 145 mgm./kgm. by mouth and 450 mgm./kgm. by enema caused moderately severe malaise, nausea, vomiting, conjunctivitis, keratitis and impaired visual acuity and hearing, which all subsided after 1 to several days; and in 1 patient thus treated eggs of *T. trichiura* were absent from the stools for several days, but

had returned 6 weeks later. This patient was the only one in whom an effect on the worms was noted and he was not cured.

The authors conclude that treatment with single doses of phthalofyne is not feasible and that it is desirable to try small doses given daily over a period of time, but only after tests of the toxicity of the drug have been done on the lower primates. Drugs related to phthalofyne may prove to be more effective and less toxic. *G. Lapage*

Bumbalo, T. S., Plummer, Lois J. & Warner, J. R. **The Treatment of Enterobiasis in Children. A Comparative Study of Piperazine (Antepar) and Pyrvinium Chloride (Vanquin).** *Amer. J. Trop. Med. & Hyg.* 1958, Mar., v. 7, No. 2, 212–14.

The authors believe that further simplification of treatment will help to reduce the incidence of *Enterobius vermicularis*, which remains relatively high and constant in some areas in America. They refer to their own evaluations [Bumbalo *et al.*: see, for example, this *Bulletin*, 1953, v. 50, 838; 1954, v. 51, 1281; 1958, v. 55, 301] of Egressin, Diphenan, gentian violet, oxytetracycline, papain, garlic, cremothalidine, carbomycin, piperazine, promethazine hydrochloride, and pyrathiazine. Though Avery [this *Bulletin*, 1956, v. 53, 1471] reported excellent results with promethazine hydrochloride, the present authors [1958 *loc. cit.*, above] obtained a cure rate of only 5·3% of 107 children given this drug and a cure rate of only 12·5% of 24 children given pyrathiazine (Pyrrolazote).

The present paper records the results of treatment with piperazine, the efficiency and lack of toxicity of which is, the authors think, well established, and pyrvinium chloride (Vanquin). Diagnosis of infection of the children treated was made by the Scotch tape method on 2 consecutive mornings, the effect of treatment being tested by 7 swabs taken by the same method on consecutive mornings, beginning 7 days after treatment ceased.

195 children, aged 5–16 years, were examined and 139 (71%) were found to be infected. All the 195 children, of which 167 were white, 12 Negro, 8 Puerto-Rican and 8 American Indians, were treated. Group I, comprising 34 children, were given 6 teaspoons of Antepar syrup (3 gm. piperazine citrate) in a single dose for 3 consecutive days and the cure rate was 90·6%. Group II (34 children) were given the same dose on 2 days with a 4-day rest period between the 2 treatment days. The cure rate was 86·2%. There were no toxic reactions in either group.

Pyrvinium chloride is a cyanine dye of which the formula is given. Royer (*Canad. Med. Ass. J.*, 1956, v. 74, 297) reported on trials of it and Sawitz and Karpinski [this *Bulletin*, 1956, v. 53, 1470] recorded successful results with it and also its high efficiency against *Syphacia obvelata* and *Aspiculuris tetraptera* in rats and mice. The present authors treated

71 of the children mentioned above with a raspberry-flavoured syrup containing this drug (Vanquin). Group III, comprising 35 of the children mentioned above were given 1·5 mgm. of pyrvinium chloride per kgm. in 2 equal doses per day for 6 consecutive days and the cure rate was 100%. Group IV of 36 children were given 2·1 mgm. of pyrvinium chloride per kgm. in the same way for 6 consecutive days and the cure rate was 97·1%. The drug was well tolerated and there were no side effects.

None of the children in any of the 4 groups given these two drugs had any preparation before treatment and no enemas or purgatives were given after treatment. Nor were any special hygienic measures taken. Blood counts and urinalyses done on 10 of the children given piperazine and on 10 of those given pyrvinium chloride were normal. The 56 non-infected children also treated remained negative.

The authors think that if piperazine had been given for 6 days, as pyrvinium chloride was, instead of for 3 and 2 days, the results would have compared favourably with those obtained with pyrvinium chloride and they think that piperazine is still the drug of choice for clinical practice and for situations in which more prolonged treatment is not possible.

G. Lapage

Lo Nigro, M. Primo caso di trichinosi in Lucania. [**First Case of Trichinosis in Lucania, Italy**] *Giorn. di Malattie Infettive e Parassit.* 1958, May, v. 10, No. 5, 414–16, 4 figs.

Mayor, H. **Focal Central-Nervous-System Involvement associated with Trichinosis. Report of a Case.** *New England J. of Med.* 1958, Mar. 27, v. 258, No. 13, 648–50.

3 weeks after eating a meal of poorly-cooked pork, a woman aged 23 suddenly developed malaise, fever, sore throat and paresis of the left arm. Within 3 days signs and symptoms of increasing intracranial pressure arose, comprising an intense throbbing headache, apathy and impaired intelligence. When investigated in hospital she showed periorbital oedema, pharyngeal congestion and flaccid paresis of the left arm. On examination of the optic fundus mild papilloedema, vascular engorgement and radial striations were noted. The cerebrospinal fluid was under increased pressure but was cytologically and chemically normal. The blood showed a high absolute eosinophilia (60% of 15,000 leucocytes per cmm.). The abnormal electro-encephalogram suggested a space-occupying lesion in the left frontal lobe, and an electrocardiogram was characteristic of general myocardial anoxia. Muscle biopsies showed an active myositis with eosinophilic and mononuclear infiltration, but no filariform parasites were recognized.

Improvement rapidly occurred and the patient left hospital on the 10th day. Three weeks later, though motor power had returned to the left arm, abnormally active reflexes persisted. The electro-encephalogram

showed improvement and the eosinophilia had declined (18% of 12,850 leucocytes per cmm.). The skin test for trichinosis had become positive. One year later, though the optic fundi were now normal, increased reflexes persisted in the arms and the legs also showed evidence of slight spasticity.

It has been stated that focal cerebral damage may occur in some 17% of patients suffering from trichinosis [*Bull. Hyg.* 1941, v. 16, 289], and of these 34 to 46% may prove fatal [this *Bulletin*, 1937, v. 36, 32]. In addition to oedema of the retina and optic disk, with vascular engorgement, striate retinal haemorrhages are said to be characteristic of this condition. Dramatic response to cortisone and to corticotrophin has been reported [*ibid.*, 1957, v. 54, 1345; 1958, v. 55, 797]. The histological changes reported in fatal cases comprise widespread granulomata containing filariform larvae, scattered throughout the subcortical white matter, with perivascular non-eosinophilic cellular infiltration and punctate subependymal haemorrhages.

[This cause of an arresting encephalitic syndrome must clearly be borne in mind in view of the value of steroid therapy: diagnostic indications include periorbital oedema and a high eosinophilia.]

J. H. Walters

Kozar, Z. W sprawie zwalczania włośnicy i tasiemców. [**Eradication of Trichinellosis and Tapeworms**] *Wiadomości Parazytologiczne*. Warsaw. 1958, v. 4, No. 3, 211–18. English summary (4 lines).

DEFICIENCY DISEASES

Fox, Helen. **The Composition of Food Stuffs commonly used in Jamaica.** *West Indian Med. J.* 1958, Mar., v. 7, No. 1, 84–92.

Dupont, M. Les végétaux comestibles en Afrique Occidentale. Contribution à la survie en milieu tropical. [**Comestible Plants in French West Africa. (Contribution to Survival in Tropical Environment)**] *Bull. et Mém. École Nat. Méd. Pharm. de Dakar.* 1957, v. 5, 195–207, 21 figs.

The English summary appended to the paper is as follows:—

"The comestible plants found in the six geographical areas of French West Africa have been reviewed.

"The emphasis is put on the wild plants that the traveller lost in French West Africa may eat."

South Pacific Commission. Noumea, New Caledonia. **The Chemical Composition of South Pacific Foods** [Peters, F. E.]. *Technical Paper No. 115.* 1958, Feb., 56 mimeographed pp., 1 map. [20 refs.]

Lassance, M., Peeters, E. & Grailet, L. L'influence des ressources alimentaires sur les données somatométriques. [**Influence of Diet on Growth**] *Ann. Soc. Belge de Méd. Trop.* 1958, Feb. 28, v. 38, No. 1, 57–73, 1 chart.

The English summary appended to the paper is as follows: —

"The authors report on a nutritional and anthropometrical survey in two groups of Ituri, ethnically similar but with different food supply.

"They find little influence of nutrition upon statute development in these two groups."

Griffel, B. & Winter, S. T. **The Prevalence of Rickets at Autopsy in a Subtropical Climate. (A Pilot Study in Israel.)** *J. Trop. Pediatrics.* London. 1958, June, v. 4, No. 1, 13–16.

"In 98 consecutive post-mortem examinations of children in Haifa, Israel, between 2 days and 2 years of age, histological evidence of rickets was found in 16 cases. Particular etiological factors, including prematurity, an age of less than 25 days and an appreciable period of hospitalisation, were present in 10 of these 16 children. Special attention must be given to the prevention of rickets in premature and hospitalised infants, and such prophylactic measures should not be neglected for the general child population in the subtropics. The influence of undernutrition and the concept of neonatal rickets are briefly mentioned."

Stransky, E. & Dizon-Santos-Ocampo, Perla O. **Clinical Rickets in the Philippines. (Report of 22 Cases in Manila.)** *J. Trop. Pediatrics.* London. 1958, June, v. 4, No. 1, 17–19.

"Rickets is relatively common in Manila. It is usually associated with general malnutrition, although lack of ultra-violet irradiation in slum regions plays a part in its aetiology. The main clinical findings in a series of 22 cases are presented. It is stressed that rickets in a tropical city, such as Manila, is usually relatively mild, having a tendency to spontaneous cure as the child gets more exposures to sunshine. It is suggested that the diagnosis of rickets is often missed, as there is insufficient awareness that the disease can occur in the tropics."

Giza, T. & Armata, J. **Frank Beriberi in a 4-Month-Old Infant.** *Arch. Dis. in Childhood.* 1958, June, v. 33, No. 169, 269–70, 3 figs.

"A 4-month-old infant fed on a butter-flour mixture, prepared from overmilled wheat meal, developed frank beriberi with cardiac enlargement and circulatory failure, a grunting cry and loss of the patellar reflexes. All these symptoms disappeared after giving him large doses of vitamin B_1.

"This appears to be the first case of true infantile beriberi reported in Europe."

Armengaud, M. Une flambée de béribéri à Dakar. [**An Outbreak of Beriberi in Dakar**] *Bull. Méd. de l'A.O.F.* Dakar. 1958, Jan.–Mar., v. 3, No. 1, 119–22, 2 figs.

The author had previously seen only sporadic cases of beriberi in Dakar, but in September and October an outbreak occurred. He saw 27 cases (15 were typical wet beriberi and 12 typical dry). All the patients were working men, who regularly consumed enormous amounts of rice. The outbreak appeared to be precipitated by an epidemic of influenza.

R. Passmore

Gómez S., F., Ramos G., R., Frenk, S., Cravioto, J. & Chávez, Raquel. Estudios sobre el niño desnutrido. Nó. XIV. Mortalidad en la desnutrición de tercer grado. [**Studies of the Malnourished Child. No. XIV. Mortality in Malnutrition of the Third Degree**] *Gac. Méd. de México.* 1957, Feb., v. 87, No. 2, 81–90.

The 3 grades of malnutrition are: I, where the weight of the child is 76–90% of the normal for its age; II, where it is 61–75% of the normal; and III, where it is less than 60%. In grade III treatment is complex. hospitalization is essential and the case-fatality rate is between 30 and 60%.

A study has been made of 733 severely ill-nourished children admitted to the Infants' Hospital, Mexico, between 1949 and 1952 inclusive. Their mean age was 31 ± 17 months and their weight 52 ± 10% of the normal for their respective ages. The average daily diet before admission had a caloric value of only 700–800 which is 40–50% of the normal requirement. Protein, derived mainly from maize and kidney beans, was 10–30 gm.; fat, 5–15; and carbohydrates, 80–140. The protein deficiency varied between 20 and 60%.

The case-mortality rate among the 733 was 31%. Of the 234 deaths, 29% occurred on the day of admission and 15% on the day after. Of the 69 who died within 24 hours of admission, 48 were in electrolyte disequilibrium and 35 had acute bronchopneumonia. The corresponding numbers for the 36 who died on the second day were 21 and 18.

A table gives the skin lesions separately for the oedematous (519) and

the non-oedematous (214). Another table analyses the main symptoms: diarrhoea 70%; dehydration 56%; "parenteric" infections 51%; vomiting 39%; fever 32%; and hypothermy 31%. Pathogenic organisms were isolated from the faeces in 28%. They were *Shigella*, 14·3%; *Salmonella*, 9·4%; and others, 4·5%.

The case mortality was higher in the non-oedematous, 35·98%, than in the oedematous, 29·67%, and slightly higher in those with pellagrous lesions of the skin, 31·7%, than in those without them, 31·4%. The most significant difference was between those with electrolyte disequilibrium, 44%, and those without, 15%. In the 322 without electrolyte disequilibrium acute bronchopneumonia was often found; there were 39 cases and, excluding those who died within 48 hours of admission, their case mortality was 53·84%. Also among this group without electrolyte disequilibrium were 152 with diarrhoea, of whom 21·4% died after the first 48 hours.

The child's weight is of prognostic importance. The deaths within 24 hours of admission among those in grade II of malnutrition numbered 5·47% but for the 584 in grade III it was 14·7%. Other factors of prognostic value are the electrolyte equilibrium, diarrhoea with disturbance of the potassium balance and bronchopneumonia, which may be associated with acidosis.

A conclusion is that more knowledge is needed of the problems of the water balance and the electrolyte balance in these severely ill-nourished children. *Allen Daley*

Senecal, J. & Aubry, L. Étude des malnutritions frustes chez l'enfant africain de Dakar. Signes cliniques, biologiques, anatomo-pathologiques. Essais d'alimentation complémentaire. [**A Study of Incomplete Form of Malnutrition in the African Infant at Dakar. Clinical Signs, Biology and Pathological Anatomy. Trials of Supplementary Feeding**] *Bull. Méd. de l'A.O.F.* Dakar. 1958, Jan.–Mar., v. 3, No. 1, 9–25.

This paper is based on a study of 596 children aged 11 to 36 months, who were seen in one year and presented signs of various incomplete forms of kwashiorkor, usually 2 or 3 months after weaning. The signs most frequently seen were loss of weight (constantly), digestive disturbances (usually diarrhoea), mental apathy, oedema, skin lesions, lesions of the mucous membranes and discoloration and modification of the texture of the hair.

All the signs commonly found in severe cases of kwashiorkor may appear singly and independently, or in any variety of combinations, in one patient. In diagnosis the finding of a low level of serum proteins (especially of serum albumin) is useful. The serum amylase level was often (but not always) low and rose with clinical improvement after treatment. Liver biopsy usually showed fatty changes. Local foods, millet,

flour, oil cakes and dried fish were used in various combinations for supplementary feeding. With some of these mixtures clinical improvement and the gain in weight were as satisfactory as when skimmed milk was given. *R. Passmore*

Scrimshaw, N. S., Behar, M., Arroyave, G., Tejada, C. & Viteri, F. El síndrome pluricarencial de la infancia y su respuesta a una dieta hiperproteica. [**Kwashiorkor in Children and its Response to Protein Therapy**] *Bol. Oficina Sanitaria Panamericana.* 1958, June, v. 44, No. 6, 513–23, 11 figs. [20 refs.] English summary.

A Spanish version of a paper abstracted in this *Bulletin*, 1957, v. 54, 1224.

Pille, G., Palancade, P. & Lunven, J. Les électrolytiques dans le traitement du kwashiorkor (potassium, magnésium et phosphates). [**Electrolytes in the Treatment of Kwashiorkor (Potassium, Magnesium and Phosphates**] *Bull. Méd. de l'A.O.F.* Dakar. 1958, Jan.–Mar., v. 3, No. 1, 41–6. [12 refs.]

In kwashiorkor losses of magnesium and phosphate may accompany the potassium losses. The mean level of magnesium in the blood was found to be lower in infants with kwashiorkor than in controls. The phosphate excretion in the urine was very low at first and diminished still more at the start of the anabolic period with treatment by protein.

A solution containing: monopotassium phosphate 45·4 gm., potassium citrate 15·1 gm., potassium sulphate 17·2 gm., magnesium acetate 3·5 gm., and water to 1 litre, has been used for treatment. The monopotassium phosphate lowers the *p*H to about 5·85. After autoclaving the solution keeps well. The ions of potassium, magnesium, phosphate and sulphate are in the same proportion as in milk. 5 ml. of the solution can be added to milk feeds without coagulating the milk and are well tolerated. The addition of these electrolytes accelerates the restoration of normal levels of protein in the serum and probably permits a more rapid intake of potassium by the cells. *R. Passmore*

HAEMATOLOGY

Moore, R. **The White Blood Cell Count during Pregnancy and the Puerperium in African Women at Mwanza, Tanganyika.** *J. Trop. Med. & Hyg.* 1958, June, v. 61, No. 6, 144–5.

The author has already recorded studies on the leucocyte counts of various persons in Mwanza and at different altitudes in East Africa [this *Bulletin*, 1958, v. 55, 802].

He now describes a similar study on non-pregnant, pregnant and post-parturient women in Mwanza, 241 in all. The results for each category are shown in tables in terms of (1) mean total and differential counts, (2) mean percentages for each type of leucocyte, (3) mean total and differential counts during the first and second weeks of the puerperium.

The total leucocyte count (6172 to 7343 per cmm.) was generally lower than in Europeans. In non-pregnant women there was a leucopenia with a relative lymphocytosis (50%). Pregnant women however had a normal neutrophil : lymphocyte ratio because of a rise in neutrophils and a slight decrease in lymphocytes (50·9% : 36·5%). There was a striking fall in the eosinophil count with the completion of pregnancy (11·5%, 7·1% and 5·1% in the 3 categories respectively). If the eosinophilia was due to parasitic infection, it is not understood why it should have fallen as pregnancy progressed.

The increase in neutrophils in the first week of the puerperium (61%) was not sustained in the second week (49·5%), which follows the pattern seen in Europe. *H. J. O'D. Burke-Gaffney*

Kramer, S., Metz, J. & Cassel, R. **Chronic Idiopathic Thrombocytopenia in the Bantu.** *South African Med. J.* 1958, June 14, v. 32, No. 24, 617–19.

" Seven cases of chronic idiopathic thrombocytopenia in the Bantu are described. The disease appears to behave no differently from that in the European with regard to clinical and haematological features. The response to steroid therapy in relapse is unpredictable. Pregnancy is often followed by severe relapse in this group."

Bokhari, S. M. H. **Iron Deficiency in Recruits, Soldiers and their Families. Report on the Investigations.** *Rev. Internat. Services de Santé des Armées.* Liège. 1958, May, v. 31, No. 5, 221–36, 15 figs.

The commonest anaemia in Pakistani recruits, soldiers and their families, is one of iron deficiency, and of all disabilities among these people this anaemia is the most common, amounting to 68% in soldier patients and to 93% in the women. After recruitment a slight improvement in the haemoglobin level occurs even without treatment. The iron deficiency anaemia seemed to be nutritional rather than due to helminthic infections. In the newly joined recruits 47% had hookworm ova in their stools but the load was light and there was no significant difference in the haemoglobin levels between these recruits and others who were free from infection. When in therapeutic trials iron was given by mouth (Ferri et Amm. Cit. grains 60 in a mixture per day or 6 grains of ferrous

sulphate with 100 mgm. of ascorbic acid), considerable improvement of the haemoglobin levels was noted. There was a rise in haemoglobin level even on ascorbic acid alone. [This last finding seems to the abstracter to confirm that the iron deficiency was not due to a lack of iron in the diet but rather to the dietary iron being in a chemically " unavailable " form. (See LEHMANN, this *Bulletin*, 1950, v. 47, 562.)] *H. Lehmann*

CHANARIN, I., ANDERSON, B. B. & MOLLIN, D. L. **The Absorption of Folic Acid.** *Brit. J. Haematol.* Oxford. 1958, Apr., v. 4, No. 2, 156–66, 3 figs. [13 refs.]

Balance studies of the absorption of folic acid in man are impracticable because faecal excretion of the vitamin considerably exceeds its dietary intake, presumably because of the synthesis of folic acid by intestinal bacteria. In man therefore the absorption of the vitamin must be studied either by measuring the excretion of folic acid in the urine after a large dose of folic acid has been taken by mouth or by following changes in the blood levels of folic acid after such a dose. This paper is a study of the changes in the serum folic acid level after a test dose, the authors having made certain that the patients were first " saturated " with folic acid and using *Str. faecalis* for the bioassay.

55 normal subjects were compared with 10 patients with pernicious anaemia in full remission following treatment with vitamin B12, 34 patients with intestinal malabsorption syndrome, of whom 20 were suffering from idiopathic steatorrhoea, 30 pregnant women, 7 of whom were suffering from megaloblastic anaemia of pregnancy and lastly with 5 patients with megaloblastic anaemia associated with the use of anti-convulsant drugs. The test dose was 3 mgm. folic acid and the serum concentration of the vitamin was followed during the next 4 hours. The peak serum concentration in normal subjects ranged from 42–170 mgm. of folic acid per ml. serum. These values were also found in treated patients with pernicious anaemia, in patients with anatomical lesions of the small intestine and in the patients with megaloblastic anaemia associated with the use of anti-convulsant drugs. In the other groups much lower values were found, although the results were not absolutely consistent. They were below the range found in normal subjects in 18 out of 20 patients with idiopathic steatorrhoea, in 1 of 3 patients with post-gastrectomy steatorrhoea, in 1 of 2 patients with pancreatic steatorrhoea and in 1 patient with cirrhosis and steatorrhoea. In 1 patient with tropical sprue a low value was obtained but when this patient was treated with antibiotics the result became normal. Normal values were also found in 3 other patients with tropical sprue after they had received a course of antibiotics.

An interesting observation was that pregnant women in general had lower peak serum folic acid levels than the control subjects. There was

no difference in that respect between normal pregnant women and others who had been treated for megaloblastic anaemia of pregnancy.

H. Lehmann

Tasker, P. W. G., Mollin, D. L. & Berriman, Helen. **Vitamin-B_{12} Deficiency in the Megaloblastic Anaemias of Malaya.** *Brit. J. Haematol.* Oxford. 1958, Apr., v. 4, No. 2, 167–76, 5 figs. [28 refs.]

Though the usual type of anaemia in Malaya is iron deficiency anaemia, a large proportion of patients admitted to the General Hospital, Kuala Lumpur, also show signs of megaloblastic anaemia [this *Bulletin*, 1956, v. 53, 237]. Many of these patients with megaloblastic anaemia are pregnant women but some are also men and non-pregnant women. It has been accepted that most, if not all, such patients with tropical megaloblastic anaemia suffer from folic acid deficiency but some may also suffer from vitamin B12 deficiency. The exact incidence of B12 deficiency cannot easily be determined by haematological methods because patients with a dual deficiency of both B12 and folic acid either fail completely to respond or show only little response to treatment with vitamin B12 alone. Deficiency of B12 can, however, be recognized in the presence of folic acid deficiency by measuring the concentrations of the vitamin in body fluids (Mollin and Ross, *Proc. Roy. Soc. Med.*, 1954, v. 47, 428). The purpose of the present paper is to report the results of a study which combines such measurements with the more usual haematological investigations.

Observations were made on 123 unselected patients with megaloblastic anaemia in Malaya. Normal subjects and patients with pure pernicious anaemia were also studied in the United Kingdom. Though the serum B12 concentrations in many patients with tropical megaloblastic anaemia were within the normal range the mean serum B12 concentrations were significantly lower than normal. In some patients they were as low as in those suffering from Addisonian pernicious anaemia. As the critical concentration the authors took 100 $\mu\mu$gm. vitamin B12 per 100 ml. serum. In 60% of the male patients, 27% of the non-pregnant and 10% of the pregnant females, the B12 concentrations were lower than 100 $\mu\mu$gm. per ml. Many of the patients with subnormal serum B12 concentrations failed to respond completely to treatment with B12 alone, and additional folic acid therapy was necessary. As a rule patients whose vitamin B12 concentrations were within the normal range showed no response at all to the administration of vitamin B12. However, a few pregnant, but more usually puerperal, women with normal B12 concentrations showed an excellent response to such treatment.

All patients with megaloblastic anaemia also suffered from iron deficiency. The more anaemic the patients were the less was this

obvious; however, there was little or no free iron in the marrows of such patients and signs of iron deficiency soon developed when the anaemia was being treated successfully with B12 or folic acid. *H. Lehmann*

Stransky, E. & Lovina, Tecla. **On a Family with Elliptocytosis in the Philippines.** *J. Philippine Med. Ass.* 1958, Apr., v. 34, No. 4, 249–54, 1 fig. & 1 diagram. [33 refs.]

"A case of elliptocytosis in a 9-year old girl of supposedly pure Filipino ancestry is described. All members of the family have been examined and while the father and the eldest sister were found normal, the mother, two brothers and three-month old sister have all elliptocytosis in a very marked degree. As Wolman and Osge claimed that pediatric studies in elliptocytosis are scarce this study may help furnish the evidence of observation of elliptocytosis in childhood."

Charmot, G. & Bergot, J. L. Les anomalies héréditaires de l'hémoglobine. [**Genetic Abnormalities of Haemoglobin**] *Méd. Trop.* Marseilles. 1958, May–June, v. 18, No. 3, 460–73.

McCord, W. M. & Gadsden, R. H. **Spectrophotometric Examination of Hemoglobin.** *Amer. J. Clin. Path.* 1958, May, v. 29, No. 5, 403–11, 7 figs. [23 refs.]

"The transmission spectrums of compounds or derivatives of normal hemoglobin (Hb *A*) and sickle cell hemoglobin (Hb *S*) have been compared and small differences noted in oxyhemoglobin, hemoglobin, acid hematin, carbon-monoxide hemoglobin, alkaline methemoglobin, and cyanmethemoglobin."

Labie, D., Rosa, J., Dreyfus, J. C. & Schapira, G. Étude de l'hémoglobine A^2 du sujet normal et au cours des différentes formes de thalassémie, par l'électrophorèse à travers gel d'amidon. [**Study of Haemoglobin A in Normal Subjects and in those with Thalassaemia, made by means of Electrophoresis in Starch Gels**] *Rev. Française Études Clin. et Biol.* Paris. 1958, May, v. 3, No. 5, 481–4, 3 figs. [13 refs.]

The English summary appended to the paper is as follows:—

"Electrophoresis in starch gels of hemoglobin permits the separation of the A_2 fraction and a chromoprotein from the A hemoglobin. With this technic, we can observe an elevation of the A_2 fraction in case of thalassemic trait.

"Electrophoresis in starch gels is much easier to use than electrophoresis in starch; we think that it can be used for the detection of heterozygous thalassemia."

Bird, G. W. G., Jayaram, T. K., Ikin, Elizabeth W., Mourant, A. E. & Lehmann, H. **The Blood Groups and Haemoglobin of the Gorkhas of Nepal.** Reprinted from *Amer. J. Physical Anthropol.* 1957, June, v. 15 (n.s.), No. 2, 163–9.

No haemoglobin other than A was found in more than 200 persons, which contrasts with findings in people so far tested in south-east Asia [see Haematology sections of this *Bulletin* since 1952].

Sprague, C. C. & Paterson, J. C. S. **Role of the Spleen and Effect of Splenectomy in Sickle Cell Disease.** *Blood.* 1958, June, v. 13, No. 6, 569–81. [31 refs.]

It is well known that the survival time of sickle cells is shortened whether transfused into normal recipients, recipients with sickle-cell trait, or recipients with sickle-cell anaemia, whereas normal cells and those of the sickle-cell trait show no shortened survival when transfused into patients with sickle-cell anaemia. The present study concerns itself with the question which is often put to the practitioner whether splenectomy might help in sickle-cell anaemia. The conclusion is drawn that the haemolytic process in that disorder is accelerated in the presence of a spleen. This finding would agree with the known diminution of the severity of this disease in older children when the spleen has been atrophied. Nevertheless even when the spleen is enlarged or has not yet atrophied splenectomy can be expected to effect the removal of only one organ in which sickle-cells tend to stagnate and though the spleen is perhaps the most important from this point of view its removal can only be followed by limited improvement. In the authors' opinion a splenectomy will be of great benefit to children with sickle-cell anaemia where no "true extracorpuscular haemolysis" is present.

This paper contains figures for the *in vivo* survival of red cells (T/2) measured by radio-active chromium tagging. In sickle-cell anaemia patients with splenomegaly the T/2 was found to be 3·7 days, after splenectomy it was 11·4 days. In sickle-cell anaemia patients without splenomegaly it was 10 days. In 5 instances of sickle-cell anaemia without splenomegaly an average survival time of 9·2 days was found but when the same cells were transfused into normal recipients (*i.e.*, in people with a normal spleen) T/2 was 4·4 days. In sickle-cell haemoglobin C disease the average T/2 was 16 days and splenectomy left this value unchanged in one patient and raised it from 15 to 21 days in one other. *H. Lehmann*

Jacob, Gillian F. & Raper, A. B. **Hereditary Persistence of Foetal Haemoglobin Production, and its Interaction with the Sickle-Cell Trait.** *Brit. J. Haematol.* Oxford. 1958, Apr., v. 4, No. 2, 138–49, 2 figs. [27 refs.]

This article reports that 2 East Africans whose haemoglobin constitution resembled that of sickle-cell anaemia (S + F) showed no haematological abnormalities except the possession of the sickle-cell trait. In neither case was haemoglobin A clearly demonstrated on electrophoresis, although there was some possible indication of its presence in one, and the solubility of the reduced haemoglobin was in both somewhat higher than in natural haemoglobin S + F mixtures. It is, therefore, considered possible that both subjects did possess haemoglobin A but that the concentration was too small for its recognition by electrophoresis. That both carried a gene responsible for haemoglobin A could be inferred from the examination of the respective parents. In both families one parent was a heterozygous sickler and in the other only haemoglobin A and haemoglobin F were found. There was no haematological evidence of thalassaemia in the propositi or their parents. The most obvious conclusion is that the 2 propositi were AS heterozygotes each having also received from the non-sickling parent a gene capable of replacing a proportion of the normal haemoglobin A production by that of haemoglobin F. The authors point out that such cases would remain entirely undiscovered unless surveys of sickle-cell carriers demonstrated a haemoglobin pattern like that of sickle-cell anaemia in otherwise healthy persons.

This is the third and fourth time that family study has shown a hereditary persistence of foetal haemoglobin independent from microcythaemic thalassaemia and sickle-cell anaemia. There have also been single instances recorded in the literature from time to time where people had a high foetal haemoglobin concentration with apparently no other haemoglobin than sickle-cell haemoglobin and yet did not suffer from sickle-cell anaemia. The authors add 2 such single observations to their 2 family investigations. All these are likely to be examples of this hereditary persistence of foetal haemoglobin into adult life. *H. Lehmann*

Went, L. N. & MacIver, J. E. **An Unusual Type of Hemoglobinopathy resembling Sickle Cell-Thalassemia Disease in a Jamaican Family.** *Blood.* 1958, June, v. 13, No. 6, 559–68, 5 figs. [12 refs.]

This communication records findings very similar to those recently described by Jacob and Raper [see above]. A 26-year-old woman of African descent in Jamaica was attending an ante-natal clinic when her blood was examined in the course of a survey undertaken to determine the incidence of abnormal haemoglobins. Her red cells sickled and filter paper electrophoresis revealed a haemoglobin pattern which was indistinguishable from that found in sickle-cell anaemia (S + F). The

woman was not anaemic and there was no complication of her pregnancy. Her father was a sickler and his blood showed on electrophoresis the AS haemoglobin pattern. The mother's blood did not sickle and her blood consisted of A and F (24%). Among the siblings of the propositus one other also showed the haemoglobin S + F pattern. However, in this case there was some anaemia and a greatly reduced osmotic fragility. One other sibling showed the haemoglobin A + F pattern similar to that seen in the mother of the propositus. The husband of the propositus was a sickle-cell trait carrier. One of her children again showed the A + F pattern and was quite well. 2, although clinically well and without relevant history, were anaemic, showed only haemoglobin S on electrophoresis, and foetal haemoglobin was found in both by the method of alkali denaturation. In 1 of the 2 the stained blood film contained numerous sickle cells but there were none in the other. One other child was an ordinary sickle-cell trait carrier and yet another, who was still an infant, seemed to be a sickle-cell trait carrier but was anaemic.

The propositus obviously suffered from no disability and had successfully given birth to 5 children, although in the laboratory her haemoglobin had been indistinguishable from that of sickle-cell anaemia patients. The authors suggest that they have here evidence for a gene which causes the production of high levels of foetal haemoglobin in adult age but which is unassociated with the usual stigmata of thalassaemia.

[This is now the fifth family in which an inheritance of a thalassaemia or thalassaemia-like gene is described which causes replacement of A haemoglobin by F haemoglobin in the adult. The association of A and F haemoglobins in adults is usually connected with thalassaemia but there was always remarkably little departure from the normal cytology in these people. The abstracter has called the condition elsewhere " a non-microcythaemic thalassaemia ". 2 families were recorded by Edington and Lehmann (this *Bulletin*, 1955, v. 52, 821) from West Africa, and Jacob and Raper (*loc. cit.*) added 2 more from East Africa. The first authors examined offspring of the propositi and the second investigated their parents. The present communication contains by far the most extensive family study and is the more valuable because the authors were able to follow the inheritance of the gene through three generations.]

H. Lehmann

Bailey, I. S. & Prankerd, T. A. J. **Studies in Thalassaemia.** *Brit. J. Haematol.* Oxford. 1958, Apr., v. 4, No. 2, 150–55, 5 figs.

It has been accepted for some time that thalassaemia major is a haemolytic anaemia due to a shortened life span of the red cell [Kaplan and Zuelzer, this *Bulletin*, 1951, v. 48, 190, and papers by other authors]. On the other hand it has been demonstrated that the major abnormality in thalassaemia is in the fabrication of the red cells and that the severity

of the anaemia is largely determined by the failure of the marrow to compensate for the blood loss by haemolysis [*ibid.*, 1957, v. 54, 606].

This paper presents the results of studies on 2 adult Cypriots suffering from thalassaemia. Radioisotopes ^{59}Fe and ^{51}Cr were used to measure respectively the production of new red cells and the survival of circulating red cells. In both patients the administered ^{59}Fe appeared in the red cells sooner than is normal and it was possible to calculate that these cells were produced at about twice the normal rate. On the one hand the radio-activity recorded over the lumbar vertebrae did not reach the normal peak, which indicated a reduction in unit marrow activity; and on the other, ^{59}Fe counts over the centre of the femoral shafts and humerus demonstrated uptake of radio-active iron. In the normal subject no uptake is detectable at these sites; the presence, therefore, of ^{59}Fe uptake in unusual sites showed that the marrow volume was enlarged and this explained why the overall output of red cells was greater than normal. There was a decline in ^{59}Fe activity of the peripheral blood after the third day together with a rise in surface counts of ^{59}Fe over the spleen. It appeared, therefore, that the spleen was destroying rapidly some newly produced red cells. 15–20% of the red cells labelled with ^{51}Cr were removed within a few days and subsequently there was a fairly constant fall of red cells, which could be interpreted as their having a mean life of about 30 days. This is consistent with the chromium labelling of two cell populations, of which the smaller was very short lived.

The conclusions of this study are that although in thalassaemia red cell formation from each unit of marrow is reduced owing to the increase in the total volume of marrow, the total production is greater than normal, but even this increase in the number of newly formed red cells cannot completely correct the haemolytic anaemia. This haemolytic anaemia is due to a shorter life span of the red cells of which there seem to exist two groups, one with a mean survival of about 30 days and one with a mean life span of only a few days. The second group of cells appear to be largely destroyed in the spleen and the interesting problem arises whether patients with a high proportion of short lived cells might not benefit from splenectomy. *H. Lehmann*

RAPER, A. B. **Thalassaemia in Families of Indian Origin.** *East African Med. J.* 1958, Apr., v. 35, No. 4, 161–70. [24 refs.]

This article draws the attention of practitioners in East Africa to the frequent occurrence of thalassaemia among the Indian population settled there. In the course of the last few years, among less than 100 haematological examinations of Indians carried out in Kampala in such a way that thalassaemia might be detected, the author came across 9 families with thalassaemia.

Whereas thalassaemia major can be easily recognized, thalassaemia minor is much more variable and the differential diagnosis from malarial

anaemia or iron-deficiency anaemia becomes more difficult. In a population in which there is much iron-deficiency anaemia, thalassaemia may easily be overlooked but there are some subtle differences between the two. Though the colour index is lower than 1·0 in both anaemias, for some reason the thalassaemic person produces cells that are much thinner than normal, or iron-deficient cells, and by so doing he ensures that his small haemoglobin-deficient cell (low MCV and MCH) has a much nearer normal haemoglobin concentration (MCHC) than the cell of iron-deficiency anaemia. Another very important difference between iron-deficiency anaemia and thalassaemia is, of course, that in the first the serum iron level is low and in the second it is normal or may even be raised. Finally there are specific qualitative features in the haemoglobin manufacture in thalassaemia. Haemoglobin F is often present and the proportion of haemoglobin A_2 is raised.

The author discusses the question of pre-marital advice. In Indians where some degree of parental choice of partners is exercised, it might be possible to take steps to avoid a marriage between two known thalassaemics. *H. Lehmann*

Josephson, A. M., Shapiro, C. M., Rozengvaig, S. & Singer, K. **The Experimental Production of Heinz Bodies in Various Hemoglobinopathies and the Thalassemic Syndromes.** *J. Lab. & Clin. Med.* 1958, May, v. 51, No. 5, 736–44, 1 fig. [14 refs.]

"The production of Heinz bodies utilizing several chemical reagents in cells containing predominantly A-, S-, and F-hemoglobins was studied. The effect of oxygen, carbon monoxide, and carbon dioxide was also noted.

"The morphology of these granules was characteristic for each chemical employed.

"Three patients with thalassemic syndromes showed spontaneous Heinz body formation.

"Erythrocytes in the shape of sickle cells can form Heinz bodies.

"The ability to form Heinz bodies does not appear to be a function of any particular hemoglobin type tested. The presence of the gene for thalassemia may predispose the individual to the formation of these granules."

Lie-Injo Luan Eng & Sadono. **Haemoglobin O (Buginese X) in Sulawesi.** *Brit. Med. J.* 1958, June 21, 1461–2, 1 fig.

The senior author has reported previously in her thesis [see this *Bulletin*, 1956, v. 53, 1376] the finding of what seemed to be a new haemoglobin in the Buginese in Sulawesi (formerly called Celebes). This haemoglobin has since been extensively studied by the authors themselves and by laboratories in the United States and in Europe. It differs

from all other known haemoglobins in its migration on electrophoresis at alkaline *p*H, where it is found between haemoglobins E and S, and on chromatography on "amberlite IRC-50" at *p*H 6·0 where it moves between haemoglobins L and S. The haemoglobin has now been called haemoglobin O and it was found in 6 of 455 Buginese examined in South Sulawesi. 3 haemoglobin O carriers were also found among 136 Makassars and one among 107 Gorontalo from North Sulawesi. One was found among 77 Toradjas who originate from Central Sulawesi but who were at the time of the investigation living in Makassar. In 233 Minahassers from North Sulawesi none was found. There has been no family study but close enquiry established that the 3 Makassars who were haemoglobin O carriers were related. *H. Lehmann*

TOXOPLASMOSIS

Paton, J. P. J., Dick, A. & Beverley, J. K. A. **Glandular Toxoplasmosis. A Report of Three Cases.** *Scottish Med. J.* Glasgow. 1958, June, v. 3, No. 6, 249–51.

"Three cases of glandular toxoplasmosis representative of Siim's (1955) three forms are reported. In one case infection probably came from toxoplasma-infected dogs autopsied by the patient. The other two cases raise the possibility of man-to-man transmission."

Varela, G., Palencia, L. & Vázquez, A. Utilización del pez *Lebistes reticulatus* (Guppy) en el diagnóstico de la toxoplasmosis. [**The Fish, *Lebistes reticulatus*, used for the Diagnosis of Toxoplasmosis**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1957, June, v. 17, No. 2, 75–80, 2 figs. [11 refs.] English summary (5 lines).

The senior author (with collaborators) has previously demonstrated the presence in animals infected with *Toxoplasma gondii* of a substance probably representing d-lysergic acid diethylamide [this *Bulletin*, 1957, v. 54, 1359]. In the present paper a method is described for the detection of this compound with the view to the diagnosis of toxoplasmosis. For this purpose material to be tested for its presence (animal tissues, peritoneal exudate, blood, etc.) is triturated in pyridine, after which the liquid is centrifuged, then the supernatant fluid is heated in a water bath at 55°C. and a current of air is passed through it in order to eliminate the pyridine. The resulting residue is dissolved in 20 cc. of water and poured out into a tube. The actual test is made by placing into the tube containing the extract one or two female fishes, *Lebistes reticulatus*. These Mexican fishes are normally of a greenish-grey colour, but when exposed to d-lysergic acid diethylamide they become black within 10–15 minutes, and retain this colour for 2 hours. Under the microscope it can

be seen that this reaction is due to transformation of the small linear chromatophores into black stellate ones.

When tested on extracts of brain, peritoneal exudate, spleen and blood of mice, rats and guineapigs infected with *Toxoplasma*, the reaction was positive in all cases. However, it was negative with similar extracts from normal mice, and from rats infected with *Trypanosoma lewisi*, *Plasmodium berghei* and *Trichinella spiralis*. Negative results were also obtained with extracts of tissue culture of *Toxoplasma*. *C. A. Hoare*

Filipowska, Ilza & Barbarowski, H. Spostrzeżenia w toku leczenia preparatem Daraprim i sulfonamidami toksoplazmozy utajonej u kobiet. [**Observations during the Treatment of Latent Toxoplasmosis in Women with the Preparation Daraprim and Sulphonamides**] *Wiadomości Parazytologiczne*. Warsaw. 1958, v. 4, No. 3, 193–6.

The English summary appended to the paper is as follows: —

"In 11 cases with the laboratory diagnosis (dye-test, Frenkel's test) of latent toxoplasmosis we applied the associated treatment with Daraprim (pyrimethamine) and sulfonamides (Sulfathiazole, Supronal). In all women a good tolerance for the drugs was observed. Regarding secondary symptoms a slight anaemia in 3 women was found and in one case, due to an error in taking the drugs—400 mg Daraprim and 20 tablets sulfathiazole simultaneously—a circulation collapse and jaundice was noted. It is yet difficult to evaluate the efficacy of the treatment though in 4 cases the patients brought forth healthy babies in spite of the backward development observed in previous pregnancy."

Harboe, A. & Reenaas, R. **The Complement Fixation Inhibition Test with Sera from Chickens experimentally infected with Toxoplasms.** *Acta Path. et Microb. Scandinavica*. 1957, v. 41, No. 6, 511–16. [20 refs.]

The usual serological reactions to infection with *Toxoplasma* are low or absent in chickens, but here the authors describe a modification of the complement-fixation inhibition test which gives significant results. The original paper should be consulted for details of the test which essentially is to observe inhibition of complement fixation by the infected chickens' sera in a mixture of immune rabbit serum and antigen prepared from chlorio-allantoic membranes infected for 4–5 days. 4 chickens (White Leghorns) were tested 10 days before and 37 days after infection with the RH strain of parasite. The dye test and direct complement-fixation reaction were negative at both times with all the birds, but the inhibition test was clearly positive in sera diluted 1 in 4. detectable at 1 in 16 and doubtful at 1 in 64, in the infected birds. *P. C. C. Garnham*

DERMATOLOGY AND FUNGUS DISEASES

Auad, A. & Brasil, G. Incidência do pênfigo foliáceo no Estado de Goiás. [**Incidence of Pemphigus Foliaceus in the State of Goiás, Brazil**] *Rev. Goiana Med.* 1957, Oct.–Nov.–Dec., v. 3, No. 4, 251–6, 1 fig.

The English summary appended to the paper is as follows:—

"The authors present the incidence and geographical distribution of Pemphigus foliaceus in the State of Goias, Brazil, based on the study of 239 cases of Pemphigus admitted to the Hospital of Pemphigus of Goiania, from October, 1952 to July, 1957. The etiology and treatment used are briefly discussed."

Oberman, J. W. & Gilbert, Enid F. **The Toxicity of 2-Hydroxystilbamidine: Probable Fatal Toxic Reaction during Treatment of Blastomycosis.** *Ann. Intern. Med.* 1958, June, v. 48, No. 6, 1401–14, 5 figs. [30 refs.]

"A fatal case is reported of North American blastomycosis in a seven-year-old Negro female, whose death is attributed to toxicity resulting from treatment with 2-hydroxystilbamidine. The literature concerning the toxicity of stilbamidine and 2-hydroxystilbamidine is reviewed. Death in this patient is believed to have occurred as a result of acute hepatic failure. A plea is made for strict adherence to the recommendation that periodic studies of hepatic and renal function be performed during the administration of 2-hydroxystilbamidine."

i. Mackinnon, J. E., Sanjines, A. & Artagaveytia-Allende, R. C. Quimioterapia de la blastomicosis sudamericana. Ensayo "in vitro" de cuatro diamidinas aromaticas, dos sulfamidas, una sulfona y un antihistamínico. Ensayo clinico de la diamidinodifenilamina. [**Chemotherapy of South American Blastomycosis.** *In vitro* **Assay of Four Aromatic Diamidines, Two Sulphonamides, One Sulphone and One Antihistaminic. Clinical Assay of Diamidinodiphenylamine**] *An. Facul. de Med. Montevideo.* 1957, Sept.–Oct.–Nov.–Dec., v. 42, Nos. 5/6, 131–42. [25 refs.] English summary.

ii. ———, Artagaveytia-Allende, R. C. & Garcia-Zorron, Noemi. Diamidinodifenilamina y coccidioidomicosis experimental. [**Diamidinodiphenylamine and Experimental Coccidioidomycosis**] *Ibid.*, 196–8. English summary.

i. Hitherto, sulphonamides have proved to be the only specific treatment for South American blastomycosis, and even with their use treatment requires to be prolonged and relapses are common.

The authors, in Montevideo, studied the effectiveness *in vitro* of 4 aromatic diamidines (stilbamidine, hydroxystilbamidine, aminostilbamidine isethionates and diamidinodiphenylamine dihydrochloride), 2 sulphonamides (sulphathiazole and sulphadiazine), an antihistaminic (diphenhydramine), and a sulphone (DDS).

Diamidinodiphenylamine dihydrochloride [M & B 938] was the most effective and it inhibited 6 strains of *Paracoccidioides brasiliensis* completely in concentrations between 2 and 5 μgm. per ml. The other 3 diamidines were less effective: 200 μgm./ml. of stilbamidine did not produce total inhibition.

The antihistaminic produced partial inhibition in concentrations of 20–50 μgm./ml. and total inhibition in 100 to 200 μgm./ml. It did not potentiate the action of M & B 938.

The sulphonamides were partially inhibitory in concentrations of 20 to 50 μgm/ml., but total inhibition was not achieved with 150 μgm./ml. Total inhibition was produced by DDS [dapsone] in concentrations of 50 to 100 μgm./ml.

The tests were carried out on 1% glucose agar, Sabouraud's agar, Krainsky's medium with asparagine, or combinations of these. 20% of horse serum was added to the medium with the drugs. Results, which are tabulated, were read after 10 days at 30°C.

A man of 49 with old pulmonary lesions of South American blastomycosis and recent oropharyngeal lesions was given 150 mgm. of M & B 938 daily by the intravenous route, after tolerance had been established by graded doses at 10 to 75 mgm. The dose of 150 mgm. was given for 2 weeks and repeated after a rest period of 17 days: the total dose given was 4 gm. 50 mgm. of diphenhydramine (Benadryl) was given by mouth an hour or two before the diamidine. After 5 weeks the ulcerating and granulomatous lesions of the oropharynx had healed and a month later the exudative lesions of the lung had mostly disappeared: fibrotic, irreversible lesions persisted.

Further trials of diamidinodiphenylamine in this disease are suggested.

ii. This paper supplements a previous paper by the authors [this *Bulletin*, 1958, v. 55, 578]. The techniques were similar. In these studies, 14 untreated mice died with intense lung lesions in 13 to 70 days. Of 16 treated mice, 6 died in 20–70 days, 3 with lung lesions and 2 of these with brain lesions in addition. The 10 survivors were killed on the 71st day. All showed numerous miliary lesions of the lungs and empty spherules of the fungus. *C. immitis* could be cultivated from the lungs of 4 of the survivors and from the brains of 3 of these. It could not be cultivated from these organs of 6 mice in which the infection had been eradicated.

Evidently the fungus was unaffected by the drug when it was localized in the brain, but was sensitive when it was in the lung.

H. J. O'D. Burke-Gaffney

TROPICAL OPHTHALMOLOGY

THYGESON, P. & NATAF, R. **Etiologic Problems in Trachoma.** *Rev. Internat. du Trachome.* 1958, v. 35, No. 2, 148–227, 20 figs. (4 coloured) on 14 pls. [Numerous refs.]

A critical review and discussion.

FLOCH, H., SOULIGNAC, J. & MAILLOUX, M. Sur le trachome et son traitement par les sulfones. [**Trachoma and Its Treatment with Sulphones**] *Bull. Soc. Path. Exot.* 1957, Sept.–Oct., v. 50, No. 5, 706–11. [11 refs.]

The authors treated a series of trachomatous patients with DDS [dapsone] by mouth and succinyl-sulphone eye drop. They report good results which compare favourably with other methods of treatment. The adult dose of DDS was 40 mgm. daily for 1 month, 80 mgm. daily for the second month and then 120 mgm. daily, with one week's rest every 2 months. *D. P. Choyce*

MISCELLANEOUS DISEASES

MANSON-BAHR, P. **Tropical Diseases: Contributions of Tropical Medicine to General Practice.** *Brit. J. Clin. Practice.* 1958, May & June, v. 12, Nos. 5 & 6, 360–64; 429–33.

These 2 papers supplement their predecessors published in the same journal in 1957 [this *Bulletin*, 1957, v. 54. 1009] in keeping non-tropical readers abreast of important aspects of tropical medicine and particularly developments during the present century. The first paper of the present series opens with a general account of the zoonoses which are divided into the primitive, rural and urban stages. Examples of these are given with special reference to their geographical and topographical features. The diseases discussed in these papers are leishmaniasis, trypanosomiasis, plague, yellow fever, relapsing fever and the typhus group.

The second paper begins with some observations on the avitaminoses, with particular reference to beriberi and pellagra. There follows a section on haematology, with emphasis on the haemoglobinopathies and their significance. The remainder of the paper deals with therapeutics. The author recalls that 50 years ago there were 3 drugs specific for tropical diseases; quinine for malaria, mercury for yaws and syphilis and ipecacuanha for amoebiasis. His present list of drugs commonly used

for treatment of tropical diseases amounts to 179 items. Some were introduced for their specific action and were found to be applicable in other diseases: mepacrine is an example. While quinine still "fills the first place as a life-saver" in cerebral malaria, it has many other uses and these are discussed. Other drugs briefly reviewed include chloroquine, mepacrine, antimony, arsenic, the diamidines, sulphonamides, sulphones and vitamins. The place of each of these in tropical medicine is indicated. *H. J. O'D. Burke-Gaffney*

Verwilghen, A. M. **Gastroduodenal Ulcer in Kwango.** *Trop. & Geograph. Med.* Amsterdam. 1958, June, v. 10, No. 2, 117–25, 1 fig. [14 refs.]

"The author believes he is the first to draw attention to the relative frequency of gastro-duodenal ulcer in the indigenous population in the Belgian Congo, and particularly in Kwango.

"Gastro-duodenal ulcers are as frequent in the Belgian Congo as in other parts of the world.

"The diagnosis may appear difficult at first as we rely on essentially objective data, whereas in civilized countries the case history suffices to bring us on the right track. However, the systematic examination of gastric acidity in every patient who complains about the abdomen has in many cases permitted us to trace the cause of stubborn pain which—too often and too easily—used to be attributed to concomitant worm diseases."

[See also this *Bulletin*, 1955, v. 52, 407 *ter.*, for other records from Africa, including Ruanda-Urundi.]

Netik, J. & Camain, R. Fréquence de l'association "cirrhose hépatique —fibrose pancréatique" en milieu Africain. [**Frequency of the Association "Cirrhosis of the Liver—Fibrosis of the Pancreas" in the African Community**] *Bull. et Mém. École Nat. Méd. Pharm. de Dakar.* 1957, v. 5, 214–22, 11 figs.

Selye, H. **Experimental Production of Endomyocardial Fibrosis.** *Lancet.* 1958, June 28, 1351–3, 4 figs. [18 refs.]

Endomyocardial fibrosis is a descriptive term of no aetiological significance; lesions of minor degree falling within its ambit may occur in many varieties of chronic myocardial disease. Though the disease in its most marked form is found most commonly in East and West Africans [this *Bulletin*, 1955, v. 52, 203, 205], rare examples have been reported from Britain, the United States and Switzerland. [The author states that Bedford and Konstam (*Brit. Heart J.*, 1946, v. 8, 236) found the disease

not unusual in the Middle East, but fails to add that their affected patients were West African soldiers.]

The aetiology remains obscure; infection, malnutrition and reaction to stress have each been proposed. The author has noted, however, that in a variety of laboratory animals it is possible at will to produce a degree of subendocardial necrosis by a combined administration of steroids and sodium salts. The lesion so produced may be associated with pancreatic necrosis, an interesting observation since a similar association has been observed in 7 out of 12 examples of the idiopathic human lesion in the United States Armed Forces. A second important observation was made by the present author that the experimental production of subendocardial necrosis in animals by this method could be inhibited by the oral administration of potassium or magnesium chloride.

The animals employed were female rats of the Sprague-Dawley strain, which were subjected to a daily subcutaneous injection of 50 mgm. of a highly potent synthetic steroid Me-Cl-COL (2α-methyl-9α-chlorocortisol) for 30 days, during which time they drank only 1% $NaH_2PO_4.H_2O$. The group to be protected received by stomach tube 1 mM. of $MgCl_2.6H_2O$ in 2 ml. water daily together with the steroid and sodium acid phosphate treatment.

It was noted that though small foci of myocardial necrosis so produced might resolve without trace, dense fibrosis replaced the necrotic myocardial fibres in the larger lesions. When the course of steroid and sodium treatment was repeated on animals which survived the first course, fresh areas of myocardial necrosis were to be seen together with the fibrotic subendocardial scars of the earlier lesions. In the animals protected from myocardial necrosis by $MgCl_2$, subendocardial fibrosis did not develop.

[Whether the analogy to the human disease of this experimentally produced lesion in small animals be true can only be determined by further work on primates. It stands as a fascinating and highly suggestive example of an endocrine origin of disease, and recalls the recent work of Gillman and Gilbert (this *Bulletin*, 1958, v. 55, 441) on fatty liver of endocrine origin.] *J. H. Walters*

Raheja, B. S. **Diethylcarbamazine in Tropical Eosinophilia.** *J. Indian Med. Ass.* 1958, May 16, v. 30, No. 10, 311–14.

"34 patients of tropical eosinophilia were treated with diethylcarbamazine. 32 of them were cured while in 2 the treatment failed. One case of failure responded to antiamoebic drugs.

"Relief was noted between second and eighth day (average 4·88 days) and complete cure between fourth and sixteenth day (average 9th day).

"Except for giddiness (noted in 4 cases) and drowsiness (noted in 3 cases) no other untoward reactions were seen."

[See also this *Bulletin*, 1958, v. 55, 920, 1051.]

Uys, C. J. & Bennett, M. B. **Kaposi's Sarcoma occurring in a Coloured Male.** *South African Med. J.* 1958, June 7, v. 32, No. 23, 577–80, 6 figs. [13 refs.]

"The clinical and autopsy findings of a case of Kaposi's sarcoma with visceral spread are recorded in a Cape Coloured subject; this constitutes the first recorded instance of the disease in this racial type.

"Added and unusual features of this case are: (a) a rapid and fulminating course occurring over approximately 9 months and (b) short but dramatic improvement to penicillin therapy."

Gajdusek, D. C. & Zigas, V. **Degenerative Disease of the Central Nervous System in New Guinea. The Endemic Occurrence of "Kuru" in the Native Population.** *New England J. of Med.* 1957, Nov. 14, v. 257, No. 20, 974–8, 4 figs.

This paper contains substantially the same information as the paper abstracted in this *Bulletin*, 1958, v. 55, 1048.

Wijngaarde, E. G. & Stolze, E. **Rhinosporidiosis in Surinam.** *Trop. & Geograph. Med.* Amsterdam. 1958, Mar., v. 10, No. 1, 34–6, 3 figs.

"Clinical and pathological report on the first case of rhinosporidiosis in Surinam; it gave the impression of being a conjunctival tumour."

[See this *Bulletin*, 1955, v. 52, 1019.]

PARASITOLOGY: GENERAL

Kuntz, R. E., Lawless, D. K. & Langbehn, H. R. **Intestinal Protozoa and Helminths in the Peoples of Western (Anatolia) Turkey.** *Amer. J. Trop. Med. & Hyg.* 1958, May, v. 7, No. 3, 298–301.

"An examination of 349 fecal specimens fixed by the MIF (Merthiolate-iodine-formalin) preservation method revealed the presence of ten species of protozoa, seven of nematodes, four of cestodes, eight species of trematodes and a tyroglyphoid mite. There was a predominance of the small race of *Entamoeba histolytica* over the large race and only a single infection with *Isospora* was noted.

"Although there was an unusually high incidence of eggs of *Dicrocoelium* the conditions of these eggs in stool specimens indicate spurious infections. *Fasciolopsis* and *Clonorchis* in Turkish soldiers from the

Korean campaign implicate travel as the probable reason for infection; *Schistosoma mansoni* infections probably were contracted as a result of pilgrimages to Mecca."

VAN BEUKERING, J. A. **A Vorticella living in the Rectal Ampulla of Man.** *Trop. & Geograph. Med.* Amsterdam. 1958, June, v. 10, No. 2, 163–4, 1 fig.

The parasite was presumably derived from ingested plant material.

ENTOMOLOGY AND INSECTICIDES: GENERAL ZOOLOGY

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

HOOGSTRAAL, H. **Research on Arthropods, Arthropod-Borne Diseases, and Hosts of Ectoparasites at U.S. Naval Medical Research Unit No. 3, Cairo, Egypt, with a Brief Background of the Organization.** *U.S. Naval Med. Res. Unit No. 3 Information Bull.* 22 pp., 16 figs. [Numerous refs.] 1954, Dec. [Revised and brought up to date as of 30 Dec. 1957.]

The U.S. Naval Medical Research Unit No. 3 is more popularly known as NAMRU-3, and is the outgrowth of the International Typhus Commission which played an important part in civil and military health during the war. At the end of hostilities the Navy Department recognized the unique opportunity which this unit offered for research and for help to Egypt, and entered into an agreement with the Egyptian Government by which old military hospital buildings were enlarged and taken over. Equipment was bought and staff installed, and the work was closely correlated with that of the adjacent very large Egyptian fever hospital, so that clinical research, as well as the other activities, could be continued. When this report was written the staff numbered 27 American Service personnel, 1 American civilian, and over 100 Egyptian nationals. Dr. Hoogstraal, the Head of the Department of Medical Zoology, gives an account in general terms of the wide range of research undertaken, based on an address delivered before the Entomological Society of America.

Entomology is prominent, and flies, lice and mosquitoes are continuously studied, particularly in relation to the organisms they carry—*Salmonella*, *Shigella*, the West Nile, Sindbis and yellow fever viruses,

and the rickettsiae of Q fever. Another aspect of medical zoology relates to field studies of protozoa, mammals, reptiles and birds. Fleas, mites and ticks have also received some of the attention they deserve. It is evident that the unit has received masses of material for detailed examination, and the list of 305 publications at the end is evidence of the immense amount of work done by this unit. There is no doubt that the quality of this research work is very high indeed.

Charles Wilcocks

Sullivan, W. N., du Chanois, F. R. & Hayden, D. L. **Insect Survival in Jet Aircraft.** *J. Econom. Entom.* 1958, Apr., v. 51, No. 2, 239–41, 1 fig.

"To find out if insects will survive the low temperatures, reduced pressure, and low humidity in the stratosphere where jet aircraft operate, several species were exposed in the unpressurized and essentially unheated sections of jet fighters and bombers during flights. A high mortality was obtained in 45- to 55-minute high-level flights of jet fighters except in the radar compartment, where heat from electronic equipment gave protection. In a jet bomber all the insects were killed on a 3-hour flight at 40,000 feet (outside air temperature −51°C.) and in two of three flights of 2 to 2½ hours at 35,000 to 40,000 feet. Shorter flights at that altitude or long flights at low altitudes gave reduced kills."

Rahm, U. Besitzt Vitamin B_1 insektenabhaltende Eigenschaften? [**Has Vitamin B1 Insect-Repellent Properties?**] *Schweiz. med. Woch.* 1958, June 28, v. 88, No. 26, 634–5. [10 refs.]

The English summary appended to the paper is as follows:—

"Reference is made to the literature wherein the effect of orally administered vitamin B_1 as an insect repellent is described or discussed. Personal investigations with six persons tested according to a highly approved method showed that in laboratory tests vitamin B_1 has no such effect. Itching was slightly reduced after intake of vitamin B_1. The tests confirm that persons react individually to mosquito bites and to various mosquito species."

[See this *Bulletin*, 1957, v. 54. 1136; 1958. v. 55, 334.]

Liu, S. Y. **A Summary of Recent Insecticidal Tests on some Insects of Medical Importance in Taiwan.** *Bull. World Health Organization.* Geneva. 1958, v. 18, No. 4, 623–49, 9 figs.

Synthetic insecticides have been used in Taiwan since 1948. Extensive residual spraying of DDT began in 1952 and gamma BHC was also used

in some areas during 1955 and 1956. To investigate the possibility that insecticide resistance might have developed during this time, the author has tested a number of insects of medical importance (6 species of *Anopheles*, 1 species of *Culex*, 1 of *Aëdes*, 2 subspecies of *Musca domestica* and 1 species of *Cimex*).

Of the anophelines, certain strains of *A. minimus* and *A. h. sinensis* showed a relatively high tolerance to DDT, but whether this represents an acquired resistance remains to be decided. In *Culex fatigans*, *Aëdes aegypti* and *Musca domestica* some strains were found to exhibit tolerances to DDT significantly different from the normal. In the latter two species, however, certain of the tolerant strains were from colonies never previously exposed to DDT. It is admitted that it is not possible yet to give an explanation of this. *Cimex hemipterus* showed no resistance to BHC. *R. J. Wood*

Chen, P. S. **Studies on the Protein Metabolism of** *Culex pipiens* **L.—II. Quantitative Differences in Free Amino Acids between Male and Female Adult Mosquitoes.** *J. Insect Physiol.* London. 1958, June, v. 2, No. 2, 128–36, 4 figs. on pl. [20 refs.]

See this *Bulletin*, 1958, v. 55, (828).

Laird, M. **Susceptibility of Adults of a Malayan Strain of** *Culex pipiens fatigans* **Wiedemann to DDT and Dieldrin.** *Bull. World Health Organization.* Geneva. 1958, v. 18, No. 4, 681–3.

Wharton, R. H. **Dieldrin Resistance in** *Culex pipiens fatigans* **in Malaya.** *Bull. World Health Organization.* Geneva. 1958, v. 18, No. 4, 657–65, 1 fig. [10 refs.]

Residual house-spraying with dieldrin at 100 mgm./sq. ft. in an isolated settlement on the east coast of Malaya, was started in 1954, as part of a field trial aimed at the control of filariasis carried by *Mansonia* mosquitoes. After 5 sprayings (28 months later) numerous *Culex p. fatigans* were observed and these persisted after the 6th treatment. Although *C. p. fatigans* was not implicated in the filariasis in this region, tests were made to investigate its susceptibility. Measurements of resistance levels were made both on larval and adult stages of the progeny of wild females, by methods [this *Bulletin*, 1953, v. 50, 1176] approved by the WHO. For comparison, tests were made on mosquitoes from a nearby settlement and from the town of Kuantan.

Both types of test showed that the mosquitoes from the sprayed settlement had become roughly 100 times and 20 times resistant to dieldrin

and gamma BHC respectively. The corresponding figures for *C. p. fatigans* from Kuantan were 60 and 7 times. (No systematic use of insecticide has been made at Kuantan, but some irregular treatments have been made by the inhabitants.) Both the resistant races were slightly resistant to DDT; but the level (about 2½ times the susceptible strain) is considered to be within normal strain variation.

Resistance of *C. p. fatigans* to dieldrin as well as BHC has been reported before, from the west coast of Malaya, following the use of BHC as a larvicide [see Reid, this *Bulletin*, 1955, v. 52, 1025].

J. R. Busvine

Busvine, J. R. & Coker, W. Z. **Resistance Patterns in DDT-resistant *Aëdes aegypti*.** *Bull. World Health Organization*. Geneva. 1958, v. 18, No. 4, 651–6, 1 fig.

3 strains of DDT-resistant *Aëdes aegypti*, from Malaya, Trinidad and Haiti, have been compared with a normal colony. By measuring their relative degrees of tolerance to a range of different poisons it was possible to define their resistance-characteristics and to plot these as resistance "spectra". By this means it was demonstrated that the two West Indian strains "showed a similar type of resistance, rather different from the (smaller) resistance of the Malay strain".

The compounds to which resistance was shown were all analogues of DDT. No tolerance to dieldrin or methoxychlor was noted.

R. J. Wood

Nielsen, E. T. **The Initial Stage of Migration in Salt-Marsh Mosquitos.** *Bull. Entom. Res.* 1958, June, v. 49, Pt. 2, 305–13, 5 figs. on 2 pls. & 1 text fig. [10 refs.]

"The departure of the newly emerged adults of the salt-marsh mosquito, *Aëdes taeniorhynchus* (Wied.) from the breeding sites was studied in Florida. The departures, which are presumed to be the initial stage of the migratory flight, have been observed to take place only in the dark period of the 24 hours, and, the vast majority of individuals being ready to take off at dusk, spontaneous mass departure took place at that time.

"Samples of the resting population of mosquitos were taken at intervals before and after the mass departure, and from the departing migrants. The average age of the males in each sample was estimated by the proportion in different stages of hypopygial rotation, from which it is concluded that migratory activity begins when the insects are six or more hours old. The end of the migratory period is not yet known. In all of 21 female departing migrants examined, the ovaries were immature and the spermathecae empty."

VAN DEN ASSEM, J. **Some Experimental Evidence for the Survival Value of the Rootpiercing Habits of *Mansonia* Larvae (Culicidae) to Predators.** *Entomologia Exper. et Applicata.* Amsterdam. 1958, May, v. 1, No. 2, 125–9.

"*Mansonia* larvae pierce *Pistia* plants with their breathing syphons, and are much less motile than most mosquito larvae. In clear water with no plants present they are eaten as readily by predators (water bugs, beetle larvae, fish) as *Culex fatigans*. If the *Mansonia* are attached to *Pistia* they are less frequently eaten."

FAIRCHILD, G. B. & HERTIG, M. **Notes on the *Phlebotomus* of Panama. XIII. The *vexator* Group, with Descriptions of New Species from Panama and California.** Reprinted from *Ann. Entom. Soc. of America.* 1957, July, v. 50, No. 4, 325–34, 38 figs. on 3 pls.

VAN ASPEREN, K. **The Mode of Action of an Organophosphorus Insecticide (DDVP). Some Experiments and a Theoretical Discussion.** *Entomologia Exper. et Applicata.* Amsterdam. 1958, May, v. 1, No. 2, 130–37, 1 fig. [10 refs.]

The organo-phosphorus compounds are believed to poison vertebrates by their anticholinesterase activity in the nervous system and some workers believe that they have a similar action against insects. However, the insecticidal action cannot be identical in all respects, for some compounds are much more toxic to insects than to vertebrates. For example, DDVP (0, 0-dimethyl 0-2,2-dichlorovinyl phosphate) is about 100 times as poisonous when injected into flies as when it is injected into mice. This difference is paralleled by a 100-fold greater activity against cholinesterase (and also other esterases) from fly head homogenates, than similar extracts from mouse brain or horse serum.

Experiments on the substrate specificity of the house-fly cholinesterase suggest that it is different from the mammalian form, but not greatly different. The author has therefore attempted to discover some reason for the different susceptibility to inhibition by DDVP. He considers two possible explanations: either the mouse brain extract contains neutralizing substances (possibly protein molecules) which bind and inactivate the DDVP; or the mouse enzyme is, by its nature, less sensitive to inhibition. By simple calculations it can be shown that mixing enzyme from fly and mouse in varying proportions will affect the critically inhibiting concentration of DDVP in different ways. Experiments in which this has been done gave results more in accordance with the second hypothesis (*i.e.*, different sensitivity of the actual enzymes). [See also this *Bulletin*, 1958, v. 55, 704.] *J. R. Busvine*

Ascher, K. R. S. **Preferential Knockdown Action of Cetyl Bromoacetate for Certain Laboratory-Reared Resistant Strains of Houseflies.** *Bull. World Health Organization.* Geneva, 1958, v. 18, No. 4, 675–7. [12 refs.]

It has been shown that cetyl bromoacetate exhibits a clear-cut preferential knockdown for resistant strains of both *Musca domestica domestica* and *Musca d. vicina*. Here an account is given of the action of this compound on each of 6 strains of *M. d. domestica*; 2 susceptible, 1 highly DDT-resistant, 1 resistant to chlordane, and 2 selected with Diazinon and chloroacetic acid respectively.

Adult flies were exposed for 2 hours by continual tarsal contact to 2-day-old deposits of cetyl bromoacetate applied from acetone solution at a density of 1 gm./m.^{2} in glass Petri dishes. The percentage knockdown was observed at given intervals of time.

Cetyl bromoacetate was shown to be less toxic to the susceptible strains and almost equally toxic to the other strains whether they were DDT-resistant or not. No explanation of this can at present be offered.

It was noted that the Diazinon-selected strain showed a high resistance to DDT.

[See also this *Bulletin*, 1958, v. 55, 462.] *R. J. Wood*

Schmid, H. Dasselbeulenkrankheit beim Menschen. [**"Warble Fly Disease" in Man**] *Schweiz. med. Woch.* 1958, June 14, v. 88, No. 24, 601–2, 4 figs.

The English summary appended to the paper is as follows:—

"A description of a case history of a 7 year old boy, attacked by warble flies (Hypoderma) in July is presented. During the course of the 7 months development period of both Hypoderma larvae there appeared at first fever episodes, then allergic blood changes; later swelling of the face with enlargement of the cervical lymph nodes, severe myalgia and finally emergence of two underdeveloped Hypoderma larvae at 3 weeks intervals."

Lewis, D. J. **Coleoptera of Medical Interest in the Sudan Republic.** *Proc. Roy. Entom. Soc. of London.* Ser. A. 1958, Apr. 9, v. 33, Pts. 1/3, 37–42. [39 refs.]

Enquiries from the public in the Sudan about the medical importance of certain beetles have usually been concerned with the species recorded here in 14 families.

"Blister beetles" belong to 2 families; the seriousness of the blistering varies with the species but cases have been reported of suspected poisoning through swallowing powdered beetles in drink.

3 cases of canthariasis were caused by an adult and 2 larvae of 3 different beetles. Other beetles cause damage to clothing, skins and human food. Scavenging beetles remove and scatter excreta in which house-flies would have bred and others kill house-fly larvae. The aquatic beetle larvae occasionally eat *Gambusia* fish used for mosquito control.

H. S. Leeson

Lewis, D. J. **Hemiptera of Medical Interest in the Sudan Republic.** *Proc. Roy. Entom. Soc. of London.* Ser. A. 1958, Apr. 9, v. 33, Pts. 1/3, 43–7. [20 refs]

"Most of the species recorded are minor pests and include Pentatomids, which enter houses, and members of the Pentatomidae, Lygaeidae, Reduviidae, Anthocoridae, Miridae and Jassidae which sometimes cause irritation by piercing, or trying to pierce, the human skin.

"Four species of Cimicidae occur in the Sudan."

See also p. 1120, Larivière *et al.*, Les ectoparasites du *Cricetomys gambianus* Waterhouse de la ville de Dakar. [**External Parasites which infest *Cricetomys gambianus* Waterhouse, prevalent in Dakar**]

Rageau, J. & Vervent, G. Présence d'Ornithodores (Acariens Argasidae) aux Iles Chesterfield (Pacifique Sud). [**Presence of Argasid Ticks in the Chesterfield Islands, South Pacific**] *Bull. Soc. Path. Exot.* 1958, Mar.–Apr., v. 51, No. 2, 238–44, 2 maps & 4 figs. [17 refs.]

Kiełczewski, B. Z badań nad roztoczami pasożytniczymi drobnych gryzoni leśnych. [**Research on the Parasitic Mites of Small Wood Rodents**] *Wiadomości Parazytologiczne.* Warsaw. 1958, v. 4, No. 3, 207–10. [11 refs.]

The English summary appended to the paper is as follows:—

"The author quotes a number of species of ectoparasites belonging to the order of mites found on small wood rodents in Poland. The parasites were recovered from the following hosts: *Evotomys glareolus* Schr., *Microtus ratticeps*, *Arvicola terrestris* L., *Apodemus flavicollis*, *Apodemus agriarius* and *Apodemus silvaticus*. The most numerous genera were: *Laelaps*, *Haemogamasus* and *Eulaelaps*. Females always prevailed. Some of the species found as: *Laelaps agilis* and *Eulaelaps stabularis* may be of importance to the research on the epidemiology of infectious diseases (tularemia, leptospirosis)."

Cahn, M. M. & Shechter, F. R. **Pruritus from an Unusual Source—Bird Mites.** *J. Amer. Med. Ass.* 1958, June 7, v. 167, No. 6, 724–6, 2 figs.

"A woman had severe pruritus and mild dermatitis caused by bird mites. The cause was found to be the northern fowl mite (Ornithonyssus sylviarum). A window air-conditioner harbored numerous birds nests infested with this mite. The patient had been extensively studied and was labelled neurotic before the source of the pruritus was found.

"Mites may cause dermatitis which is sometimes severe or sometimes insignificant. Animal mites may be the vectors of serious systemic disease. While bird mites are an unusual cause of pruritus, they should be considered in the differential diagnosis, especially when the patient does not respond to routine therapy."

[See also this *Bulletin*, 1953, v. 50, 580; 1958, v. 55, 596, 597.]

Academy of Sciences of U.S.S.R. [**Parasitological Symposium**]

This book was reviewed on p. 959.

MISCELLANEOUS PAPERS

de Souza Araujo, H. C. 30 anos de atividades do Laboratório de Leprologia do Instituto Oswaldo Cruz. [**30 Years Work of the Leprological Laboratory of the Instituto Oswaldo Cruz**] *Rev. Brasileira Med.* Rio de Janeiro. 1957, Nov., v. 14, No. 11, 789–94.

Voors, A. W. & Metselaar, D. **The Reliability of Dental Age as a Yard-Stick to assess the Unknown Calendar Age.** *Trop. & Geograph. Med.* Amsterdam. 1958, June, v. 10, No. 2, 175–80. [14 refs.]

"(1) The standard deviations of the eruption times in the left upper teeth are of the same order of magnitude in all the population groups compared.

"(2) The average moment of eruption of the first deciduous tooth and of the left upper first deciduous molar coincide with the same calendar age in the population of New Guinea and the Western populations we compared.

" (3) The eruption of the left upper second deciduous molar and the left upper first and second permanent molars is earlier in the New Guinea natives around Lake Sentani than in the U.S.A. and England.

" (4) The eruption of the left upper first permanent incisor seems to be earlier in the New Guinea natives than elsewhere, although the difference is not significant in all observations."

REPORTS AND SURVEYS

See also p. 1082, West African Institute for Trypanosomiasis Research. **Annual Report 1957.**

See also p. 1085, Tanganyika. **Medical Department. Sleeping Sickness Service Annual Report 1957.**

Passager, P. & Dorey, R. El Goléa (Sahara algérois). Étude géographique historique et médicale. [**Geographical, Historical and Medical Study of El Goléa, Algerian Sahara**] *Arch. Inst. Pasteur d'Algérie*. 1958, Mar., v. 36, No. 1, 75–152, 32 figs. on 16 pls. & 7 text figs. [41 refs.]

El Goléa is a northern Saharan oasis where liberal springs from the south Atlas mountains make it possible for the land to support a population of some 12,000 people who, with their surroundings, constitute a small ecological entity which has probably changed very little since prehistoric times. The climate is extreme, temperatures ranging from 0°C. to 44°C. or even 58°C. Within narrow limits the soil is fertile. The main crops are the date palm and a great variety of fruit trees and cereals, together with grazing for herds of camels and goats. The usual diet is varied, but there may be a gross deficiency of food at certain times of the year.

Customs, habits and the nature of these people are described together with a statement of their medical condition. The chief endemic diseases appear to be trachoma, ophthalmia and surface infections of the skin. Recent surveys showed that 87·8% of children examined were affected by trachoma. After these the next most important group would appear to be the epidemic conditions, particularly smallpox, whooping cough and dysentery, and of lesser importance German measles, chickenpox, scarlet fever, influenza, diphtheria. Tuberculosis is common, though with

a peculiar epidemiology, infection as demonstrated by the Mantoux reaction being commonly delayed until adult life. An account is given of malaria from 1897 to the present day, during which time it has passed through several epidemic phases when *Plasmodium falciparum* tended to predominate, transmission was by *Anopheles sergenti*, and has latterly been terminated by the development of drainage works. No cases have been recorded during 1956 and 1957. Cancer is notably rare; records of 23 years show only 6 cases, and two special enquiries have revealed 5 cases in 5 years and 3 cases in 2 years.

The authors conclude with a statement on indigenous medicine which includes a list of the drugs which are used, together with their French, Arabic and botanical names and mode of use.

[For previous monographs on Algerian localities, see this *Bulletin*, 1957, v. 54, 894, 896, 1479.] *G. Macdonald*

DE CARVALHO, A. G. & CASTRO, A. de A. Realizações da Circunscrição Goiás do Departamento Nacional de Endemias Rurais durante o ano de 1956. [**Achievements of the Goiás Section of the National Department of Rural Endemic Diseases during the Year 1956**] *Rev. Goiana Med.* 1957, Apr.–May–June, v. 3, No. 2, 99–123, 8 figs. English summary.

The National Department of Rural Endemic diseases was formed in Brazil in 1956 and incorporated such existing specialized services as the National Malaria Services. The aim of the Department is control of the major endemic diseases.

In the section of the Department which functioned in the State of Goiás, activities during the first year of operation are briefly reported in relation to 5 major diseases.

The following statistics regarding antimalarial work in the southern and northern parts of the State are taken from the report and from detailed figures tabulated in it.

	South	*North*
Localities visited	1,951	802
Houses ,, ...	30,082	3,928
Persons examined for parasites	18,394	5,774
Number of persons positive	905	407
Species:		
P. vivax	824	311
P. falciparum	80	93
P. malariae	1	2
Mixed	–	1
Localities sprayed with DDT	3,717	339
Houses sprayed	35,440	15,951

The malaria rate was 4·81% in the South, 7·04% in the North and 5·42% for the State. Blood films of 4,640 newborn infants in the city of Goiânia were all negative.

Throughout the State 8,569 houses were visited for anopheline surveys: 111 were positive, and the anopheline density was 1·9%. Of 1,598 anophelines captured, 2 were *A. darlingi* and 8 *A. albitarsis*, which are the principal vectors there.

Treatment was given to 28,338 patients in 502 localities: antimalarial drugs were distributed to the extent of 868,444 tablets to private and official institutions.

Surveys for Chagas's disease were made in 3,398 houses in 66 localities in 3 southern counties. Triatomid bugs (*Panstrongylus megistus*, *Triatoma infestans* and *T. sordida*) were found, with a rate of 1·41 bugs per house. 4,806 bugs were captured and 109 out of 716 examined for infection were positive (15·5%). Spraying with BHC was carried out in 34,072 houses of 1,327 localities in 33 counties.

173 viscerotomy specimens from 70 places were examined for yellow fever: all were negative. In 24 counties 111,474 yellow fever vaccinations were carried out. In 3 counties examination of faeces for hookworms in 4,193 persons revealed 2,999 (71·5%) positive. All the patients were treated with tetrachlorethylene without toxic effects, and with iron where anaemia was severe. The dosage schedules are given.

Trachoma in Goiáz is a subsidiary focus from two original foci, in the States of Ceará and São Paulo respectively and is the result of former migrations from these states.

During the year, 2,862 persons were examined and 164 cases of trachoma were found. Treatment took the form of sulphonamides and the antibiotics oxy- and chlortetracycline in the form of eye ointments. The treatment régime is outlined. *H. J. O'D. Burke-Gaffney*

BOOK REVIEWS

MARTINDALE. **The Extra Pharmacopoeia. Incorporating Squire's Companion.** 24th Edition. Vol. I. pp. xxx + 1695. 1958. Published by direction of the Council of The Pharmaceutical Society of Great Britain [HUDSON, D. W. (M.P.S.), President]. London: The Pharmaceutical Press, 17, Bloomsbury Square, W.C.1. [65s.]

This review appears also in the *Bulletin of Hygiene*, 1958, v. 33, 898.

"Martindale" is well known as one of the most useful reference books on the shelf. It is published at intervals as two alternating volumes. Volume I provides information upon almost all the official and proprietary medicines used in Britain and in many overseas countries. Volume II is principally a technical handbook covering assay procedures, clinical

biochemistry, sterilization processes, and many other techniques related to the modern practice of medicine and pharmacy.

The book under review is the 24th edition of Volume I. It has been completely revised and reset and contains a vast amount of up-to-date information.

There are 1,398 pages of description of the properties and uses of drugs; additional sections deal with antibiotics, immunological products and radio-active isotopes. The general arrangement of the drugs is alphabetical, but special groups of compounds of similar pharmacological action, such as barbiturates, sulphonamides, tranquillizing agents, amoebicides and antimalarials, are described under the titles of one well-known member of the group. This is of great convenience to the reader.

Generous space has been allotted to the more recent developments in medicine; for example, the section on cortisone and related substances covers 50 pages. Proprietary medicines together with details of their composition are listed in the sections which relate to the principal ingredients.

At the end of each monograph there is a selection of short, pithy abstracts of publications which relate to the uses of the drug. Where conflicting opinions have been advanced, the editors have taken pains to make a fair selection from the different schools of thought. These abstracts provide the reader with references to original work in the readily-available medical literature, and serve as useful starting-points for wider surveys.

Supplementary lists provide brief descriptions of drugs which are outdated, or of too recent development for inclusion in the main section of the book.

There is a therapeutic index which enables the reader to refer rapidly to the drugs which are in use for the treatment of any named disease.

The main index is a masterpiece and contains nearly 20,000 entries. It is indicative of the painstaking work of the Editor and his staff in the production of this useful volume.

The quality of the paper and typescript is excellent.

L. G. Goodwin

Lee, Douglas H. K. **Climate and Economic Development in the Tropics.** pp. xviii + 182, 6 figs. 1957. [Published for the Council on Foreign Relations, 58 East 68th Street, New York 21.] New York: Harper & Bros. [$3.50; 28s.]

The (U.S.) Council on Foreign Relations set itself by means of a study group to analyse the reasons why "underdeveloped" and "tropical" are almost synonymous terms in describing countries. The Council assembled a number of authorities whose papers and discussions form the material on which this book is founded. The group was immediately faced with the problems of defining "underdevelopment" and

" tropical ", crystallizing its purpose as an analysis of " the effects that climate may have upon any effort to increase productivity of the regions characterized by moderately high temperatures and high humidities throughout most of the year ". Within this definition of moderately warm climates there is an enormous range of weather conditions from the warm humid tropics to the intense dry heat of desert areas. Previous classifications of these climates are discussed, and a new one is put forward, illustrated by maps based on temperature and vapour pressure in the hottest and coolest months of the year. The result is undoubtedly more descriptive than some others, though it is difficult for the reader to appreciate maps in which 19 different classes of weather are described.

The study group proceeded to analyse the effects of climate on crop production, animal production, human health and efficiency, and industry, in each case following a similar pattern of examination of main effects, statement of the means to overcome faults, examination of the factors which complicate such remedial measures, a statement of the form of action which is finally recommended, and the regions which should be given preferential treatment in this respect. The determinist school of thought which holds that climate has some direct effect on human activity, intelligence and industry is firmly rejected.

The material which is presented under these headings varies greatly in its novelty and authority of statement. Perhaps one of the most interesting is the author's own contribution on the direct effect of climate on physiological efficiency, which he illustrates by a chart of thermal strain in relation to temperature and humidity, relating climatic conditions to thermal comfort and efficiency in a novel manner. The remedy for crop problems—principally the leaching, poverty and wastage of soil, crop diseases and loss on storage, aggravated by conservatism, ignorance and poverty of the farmer—appears to lie more in the techniques of education and research than in direct agricultural action. The section on animal production starts with statements on the necessity for a considerable intake of animal protein in human nutrition, with which not all nutritionists would agree. The basic problem facing animal husbandry in the tropics is the fact that all mechanisms of breeding for higher productivity whether of milk, meat or work, involve lower tolerance of heat strain, and the standards attained in temperate countries may therefore never be attained in the tropics. There is, however, much room for improvement and for study of the detailed mechanism of heat tolerance in animals.

Perhaps the greatest restraint to development lies in social factors and a lack of appreciation of the need for development or even of any incentive to undertake improvement. Human health and efficiency are best measured in terms of the expectation of life, and the direct effects of climate on them are analysed by the author. In later parts of this section there are some conclusions curiously like those of the determinist school previously rejected—" Some loss of mental initiative is probably

the most important single direct result of exposure to tropical environment "—and optimism is very restrained; the eradication of dominating diseases might mean the outcrop of other forms, resulting in only a change in the map of disease. While the endeavour to lessen morbidity and mortality from preventable diseases must go on, " it must be conducted with all the wisdom that sober reflection suggests and with a due regard for the possible ultimate consequences of a massive interference with the biological balance hitherto existing ".

The influence of climate on industry is less fully discussed, with principal emphasis on transportation, the deterioration of materials, on power supply, and the carrying out of industrial processes. The review of prospects is optimistic; emphasis is laid on the advantages that may be gained from research, and a series of formal conclusions indicating the lines along which the United States might help in tropical development is set out. [This is an interesting review of an important subject stimulating thought, though its conclusions will not be considered to have ended discussion on the subject.] *G. Macdonald*

Dey, N. C. [B.Sc., M.B.B.S., D.Bact., F.D.S.] **Medical Mycology including Laboratory Technique and Therapeutic Recipes.** Foreword by G. Panja, M.B.B.S., D.B., F.N.I. 127 pp., numerous illustrations. 1958. Calcutta 6: 2, Cornwallis Street, India. [Rs 15.00; 30s.; $5.00.]

This book consists of an introduction to medical mycology designed primarily to meet the needs of the graduate from the Indian university who wishes to follow post-graduate courses in dermatology and tropical medicine in India. Emphasis is laid upon the mycoses likely to be encountered in that country, and the great endemic mycoses of the New World are dealt with rather briefly.

The subject-matter is introduced by a glossary of the commoner terms in current use and these are illustrated by line drawings. The pathogenic fungi are grouped into chapters according to the author's modification of Vuillemin's classification. Each disease is dealt with briefly under clearly defined headings covering geographical distribution, source and mode of infection, laboratory procedures and expected findings including cultures, histopathology, serology and pathogenicity tests and finally clinical symptoms and therapy. To each chapter is appended a list of references to the older literature which is largely of historical interest.

The book contains numerous illustrations, both natural photographs and line drawings, of clinical and histological features and the macroscopic and microscopic characteristics of the fungi in culture. In a number of instances the salient points are presented in tabular form as well as being described in the text. The book is completed by two useful appendices. The first gives formulae for stains, solvents and culture

media and also techniques suitable for the collection of morbid material from cases of superficial infection. The second appendix is concerned with the formulae of therapeutic agents for external application.

Jacqueline Walker

With deep regret we record the death on 5th September 1958 of Lieutenant-General Sir James Bennett Hance, *K.C.M.G.*, *K.C.I.E.*, *O.B.E.*, M.A., M.D., F.R.C.S. Ed., I.M.S. (Retd.), who had been a Member of the Honorary Managing Committee of the Bureau of Hygiene and Tropical Diseases since 1946.

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